

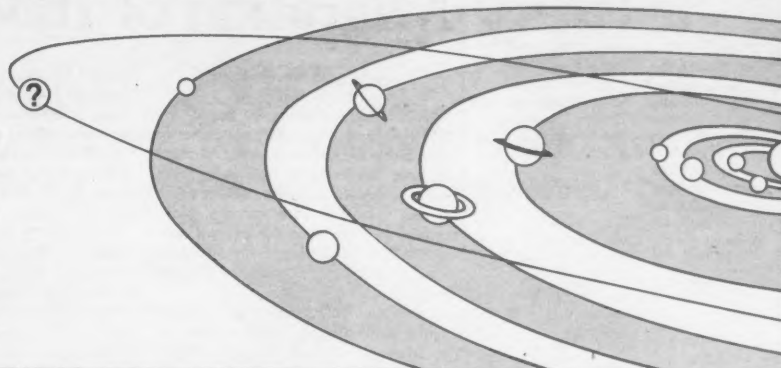
# The Search for a 10th Planet

By Lois Paul  
CW Staff

WASHINGTON, D.C. — Ever since Neptune's discovery in 1846, astronomers have been discussing the possibility that there may be a massive planet, as yet undiscovered, beyond its orbit. A computerized analysis being conducted here by the U.S. Naval Observatory (USNO) is the most recent search for what could be the 10th planet.

Neptune itself was discovered similarly, from a prediction calculated on the basis of observed irregularities in the position of Uranus, the next planet in. In 1930, Pluto was found during a search for an object to

(Continued on Page 4)



# COMPUTERWORLD

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## Product Spotlight

### Query Users Seek Ease of Use

By Rita Shoor  
CW Staff

Ease of use has to be the No. 1 criterion for any survey of high-level query software, according to both the customers who purchase these packages and the vendors that sell them. If short training times are any indication, the eight products with characteristics listed in the charts on Pages 14 and 15 seem to fulfill this qualification.

Meant to be a representative grouping of what is currently available in query software for the IBM-compatible operating system environment, the chart includes eight offerings from seven vendors: Applied Data Re-

(Continued on Page 15)

## Technical Problems Cited

### IBM Delays First 3380 Shipments

By Tom Henkel  
CW Staff

WHITE PLAINS, N.Y. — Unspecified technical problems have forced IBM to delay first shipments of its 3380 disk drive from the first to fourth quarter of 1981.

While IBM refused to say exactly what is wrong with the 3380, industry analysts believe there are production problems with the unit's head disk assembly (HDA) — a new technology item announced on the 3380 last June. IBM apparently cannot produce the HDA fast enough to meet the original delivery schedule.

IBM said it has already made some changes in the 3380 and as soon as testing is completed, a new delivery schedule will be announced.

Although IBM formally announced the delay last week, informal notification to users began at least two weeks

ago, and some users caught wind of the problems over a month ago, sources said.

The delay has caused mayhem among users who expected earlier deliveries of the 2G-byte 3380. Those users are now scrambling to find IBM 3350-type disk

drives. It takes about two years to get 3350s from IBM, and analysts said IBM probably won't beef up production of that product because it is older technology. Plug-compatible manufacturers (PCM) offer 3350 look-alikes

(Continued on Page 6)

## Microdata Moves Into DDP With British-Designed Unit

IRVINE, Calif. — Microdata Corp. has entered the distributed data processing (DDP) market with a multi-processor system for business and government organizations having remote accounting and administrative units.

The Sovereign system features modular architecture and add-on intelligent processors. In addition, it offers data entry, transaction data entry, local user-programmed batch and transaction processing and batch and interactive communications, the vendor

spokesman claimed.

Developed by Microdata's wholly owned British subsidiary, Computer Machinery Company, Ltd., Sovereign will be marketed, installed and serviced in the U.S. through the vendor's domestic field service locations. The system was unveiled in England in 1978.

A typical small Sovereign system may consist of 120K bytes of processing power, seven 520-char. CRT terminals, one 2,000-char. intelligent pro-

(Continued on Page 6)

## Travelers Says Cobol Conversion Could Cost a Cool \$20 Million

By Rita Shoor  
CW Staff

HARTFORD, Conn. — It could cost the Travelers Insurance Companies close to \$20 million to convert its Cobol systems to a new standard, according to a senior vice-president.

That figure is based on today's costs, Joseph Brophy said as he explained his opposition to the Cobol standards proposed by the American National Standards Institute's (Ansi) X3J4 committee [CW, Jan. 26].

By the time a new standard would actually be implemented — perhaps five years from now — Travelers could have twice as many systems and lines of code to convert. An inflation rate of possibly 10% would also have to be

added to the final price tag, he said.

Brophy's estimates were based on a recent study performed by the General Accounting Office (GAO) to determine what it would cost the U.S. government to implement a new Cobol standard: "in the area of \$580 million."

Travelers is, in fact, just completing the conversion of its Cobol programs from Cobol-68 to Cobol-74. "When the dust settles, it [the '74 conversion] will probably cost us an estimated \$1.5 million," he said.

There was no urgency about the '74 conversion, he observed, because there were no specific benefits to be derived from it. The conversion got "priori-

(Continued on Page 24)



## Miles of Aisles

McDonnell Douglas Automation Co. has opened what it boasts is the world's largest computing center under one roof. Story on Page 30.



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# Migration of IBM Users Sighted

By Marcia Blumenthal

CW Staff

WALTHAM, Mass. — Lured by IBM's 4300 and by price cuts in Series 30 equipment, IBM 360 and 370 users are now migrating in droves to these newer systems, causing a rapid erosion in the installed base of the older models, according to the seventh annual "IBM Migration Survey" published recently by International Data Corp. (IDC).

In addition, the survey also spotlighted the heavy migration of users to the Multiple Virtual Storage (MVS) and DOS/VSE operating system environments.

The IBM 4300s are virtually wiping out the 360 family, IDC concluded. By 1982, less than 30% of the 1978 installed base of 360s will be in operation. Lower end 360 users are primarily opting for 4331 systems, while those with models 360/50 and above are edging into the 4341 fold.

More than one-half of the demand for 4331 Group 1 units is for new applications, many in distributed data processing, the report observed.

Besides the 360 series, users of IBM 370/115 and 125 models are favoring the 4331 on the two-year lease plan. By 1982 less than 20% of the low-end 370 1978 installed base will be in existence, the report predicted.

IBM 370/138 users are favoring 4341 models, while 370/148 users are migrating heavily to the 4341 Group 2 and 3033S systems. The installed base of 370/148 users will hold up moderately well, IDC forecast, noting about 44% of the 1978 installed base of those systems will still be in operation in 1982.

Users of the higher end 370 systems, 158s and 168s, will migrate primarily to the 3033N and S models. IDC anticipated erosion in the 158 base as users

install 3033S rather than purchasing their old 158s in the used market. This trend will surface markedly next year, the survey forecast.

However, the installed base of 158s will hold up well because users of lower end 370 models will migrate to the 158 system.

Contributing to these migration patterns is IBM's recognition that software has become the major vehicle for hardware selection, IDC noted.

IBM has placed significant emphasis on its MVS product line, with Release 3 playing a crucial role in its new processor family. By making MVS available on less powerful systems, IBM has provided a route for migration to larger systems.

At the same time that IBM lowered hardware requirements for MVS users — for example, with MVS capability on the 4341 — the company extended DOS upward, offering DOS/VSE capability on the 3033.

Currently, DOS/VSE is the favorite of IBM 370 users, with 53% of users listing that as their operating system. By comparison, 73% of IBM 4300 users favored DOS/VSE.

However, by the end of this year, the ratio of DOS/VSE to DOS/VSE will flip-flop, with DOS/VSE claiming a 60% share of all operating systems, while DOS/VSE will plunge from a 53% to an 8% share, IDC forecast. This observation applied to users of the range of 370, Series 30, 4300 and plug-compatible systems.

IDC's "IBM Migration Survey" was compiled from 755 responses from IBM sites with a total of 897 IBM CPUs and 39 plug-compatible systems. The survey represented a 6.2% share of IBM 360 and 370, Series 30 and 4300 systems installed at the end of 1979.

The survey costs \$1,995 and is available from IDC at 214 Third Ave., Waltham, Mass. 02154.

## IBM 4300 Tops Leasing Mart

WALTHAM, Mass. — Some 51% of the users who intend to lease equipment from third-party lessors will opt for some model of the 4300 series, according to a recent survey.

The Series 30 is the second most popular leased system and is expected to garner 17% of the third-party market during this year, International Data Corp. (IDC) reported in its recently published "IBM Migration Survey."

However, the trend toward shorter term leases is now surfacing. This year leases with terms of one to three years will make up 61% of all leases written, IDC forecast. By comparison, only 41% of the leases arranged in 1979 had those terms.

At year-end 1978, five-year leases

were the most prevalent, but today about 20% are two-year leases. While the current market share for five-year leases will remain stable for the near future, the once-varied equipment models under these leases have largely narrowed to Series 30 equipment.

During 1979, 84% of third-party leases written were operating leases, and IDC expects that percentage to remain stable this year.

Prices for equipment leased through third-party vendors continue to offer significant advantages over leases provided under IBM's Monthly Availability Charge (MAC). Generally, Series 30 leases are priced at 70% of IBM's MAC while leased 370 equipment ranges from 40% to 69%, IDC found.

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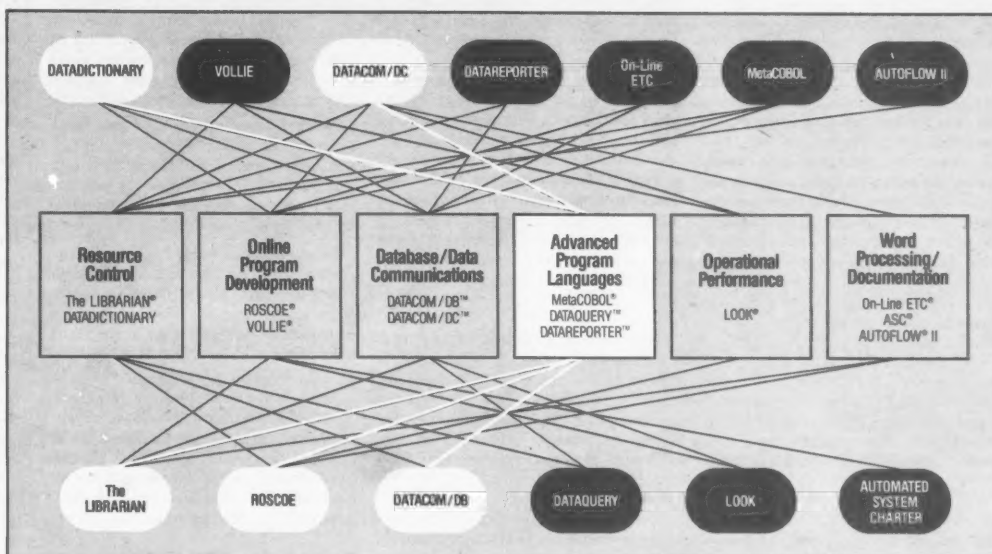
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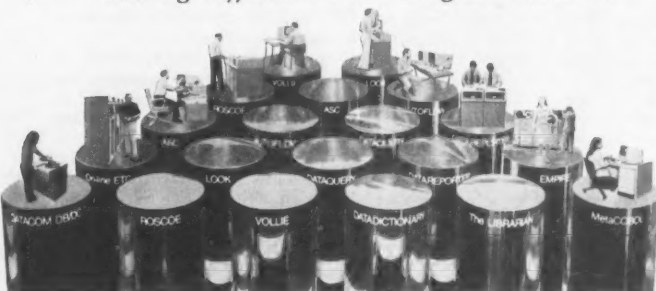
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# NTIA Sees Realistic Hope of Success Federal DP Policy Overhaul Urged

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — Poorly defined, often conflicting policies on privacy, security and the proper role of government continue to trouble federal telecommunications and DP system development.

According to one federal official, the government is at least tackling this problem head-on and, unlike the private sector which faces analogous difficulties, has a realistic hope of solving the policy dilemmas plaguing systems designers and managers.

At the government level, one reason system proposals run afoul of congressional and executive-branch policymakers is that agencies do not consider the policy implications until after systems are designed and proposed for implementation, Terrill Steichen of the National Telecommunications and Information Administration (NTIA) said recently.

Addressing a March 16 meeting of the Computer Law Association, Steichen remarked that agencies "often remain oblivious to the policy-level problems as they promote their programs" and put off policy considerations until the last minute and then try to "steamroll" the systems through congress and oversight agencies.

He gave as obvious examples the ill-fated "Fednet" proposal to establish a governmentwide telecommunications system several years ago and the controversial systems administered by the Federal Bureau of Investigation's National Crime Information Center (NCIC).

A more recent example, according to Steichen, director of the Government Communications Office, NTIA Office of Federal Systems and Spectrum Management, is the National Driver Register (NDR), a nationwide telecommunications system proposed by the U.S. Transportation Department to help identify problem drivers and keep them off the road.

## Unplanned Effects

What these systems have in common, he said, is that although proposed to advance the mission of various agencies, they threaten to drastically change the nature of the implementing organizations.

By upgrading the NDR, for instance, the Transportation Department would suddenly become involved, to no small extent, in law enforcement — a devel-

opment probably not considered during system design, Steichen said.

Accompanying that policy difficulty, the NDR proposal now before Congress faces the same problems of privacy, security and federalism that have surrounded the NCIC upgrade proposals for years. The basic problem, he said, is that automating a management link of any organization "is not a benign process."

To illustrate that point, he noted the almost life-or-death challenge facing the Postal Service because of emerging private electronic mail services. He also pointed to the inflationary impact electronic funds transfer (EFT) systems can have because they reduce the time large sums of money are held up during transactions, thus freeing the money for further use, which in effect increases the money supply.

## Redefining Processes

We are seeing evidence, he said, that information systems are causing redefinition of the processes they were designed to facilitate. By trying to take advantage of new technology to increase efficiency, organizations are changed "in very fundamental ways," Steichen said.

The NCIC and NDR systems, for example, could increase federal involvement in traditionally state-level activities. And their far-flung recordkeeping systems could increase private citizen accountability, while reducing the accountability of government officials, according to Steichen.

Compounding these policy considerations, he said, is the fact that policies often conflict. By trying to promote deregulation of the telecommunications industry, for example, the government might lose opportunities to procure services at the lowest possible cost.

Conversely, he said, proposals to consolidate systems to achieve greater government efficiency and economy often ignore the fact that few vendors are able to provide systems support for such large undertakings and government efforts to promote competition are thereby cancelled out.

The vexatious problems of privacy and security are always present in the design of federal telecommunications and DP systems, Steichen added. Privacy protection mechanisms almost always reduce the efficiency sophisticated technology is expected to produce, he noted.

While these policy questions at first blush seem to be government problems, that is only because government is now forced to deal with them, Steichen said. Commercial organizations have not addressed these problems as yet, but the issues are inescapable. The security issue is just one example of this, according to the NTIA official.

As information systems consolidate large amounts of data they pose a "potential for absolutely massive fraud," Steichen noted, which is often not taken into account during the cost/benefit analysis of system design.

He also noted the "enormous" privacy abuses found in the private sector by the Privacy Protection Study Commission. In addition, the federalism issue is directly analogous to antitrust problems in private commerce, he said.

On the brighter side, Steichen said he believes these and similar problems will be brought under control, if not solved, if only because the price of not solving them is too high. He said the current level of policy awareness in government "is very encouraging." Although the government lacks a central "policy focus" for these issues, NTIA is working with the Office of Management and Budget and the General Services Administration to form the needed focus in aggregate, he said.

Steichen also noted that the three agencies are undertaking a number of studies and policy reviews in these and related areas to better plan for government use of current and emerging technologies.

The recently enacted Paperwork Reduction Act of 1980, with its mandate for better technology planning at the agency level and for more agency accountability, is also a step in the right direction, he added.

Unfortunately, Steichen added, there is not much corresponding awareness of these issues in the private sector. He suggested private organizations should begin to communicate with NTIA and other federal departments on how to best deal with these difficult and often conflicting policy matters.

# Navy Enlists 4331 to Speed Search to Locate 10th Planet

(Continued from Page 1)

account for disturbances in the orbits of Neptune and Uranus.

The astronomers at USNO are using an IBM 4341 with 4M bytes of memory to analyze approximately 6,000 observations of Neptune on record to determine if they indicate the presence of some yet-undetermined influence. These observations are compared with computations of Neptune's orbit, taking into account all known physical effects, such as disturbances produced by the known planets and the sun.

## System Upgraded

According to George Kaplan, an astronomer with the Nautical Almanac Office of the USNO, the extensive calculations are "real number crunchers" and the upgrade from an IBM 360/40 to the IBM 4341 last March has helped a great deal.

The USNO employs a card and batch-oriented system. "Most of our work is CPU-bound," Kaplan explained. It requires about two hours of 4341 CPU time to compute a 400-year orbit for one planet, whereas the IBM 360/40 required an entire weekend of CPU time for the same computation, he said.

Kaplan said the USNO currently is "hampered by aging peripherals," but is planning to upgrade these and to switch from an OS/MVT with Hasp system to a VM/370 by the end of the year. A Zeta 6000 series 36-in. pen plotter is used extensively.

Once an orbit has been calculated, it is compared to positions of the planet observed by the astronomers over the last century using a Least-Squares program. "There is always a slight devia-

# DG Hikes Prices 5%

WESTBORO, Mass. — Data General Corp. last week hiked prices an average of about 5%, effective immediately, on most of its computers and peripheral devices.

Unaffected by the across-the-board increases are the costs of the firm's MV/8000 32-bit processor, C150 CPU with MOS memory or Commercial Systems' C510 small business computer package. The company's MicroNova MP100 processor and D100 and D200 CRT terminals are also not affected by the price boost.

DG's Eclipse computer line, however, will be affected by the price boost. For example, an Eclipse C350 with 128K bytes of memory that previously cost \$49,500, will now cost about 9% more or \$54,000.

The recent price hike marks the second time in the firm's history that DG has announced across-the-board cost increases. But, it is not the first time that DG has raised its prices.

Last year, the company selectively boosted prices on its low-end computers to offset rising equipment costs. The total cost of materials, wages and manufacturing processes were cited as the reasons for this latest price boost.

tion we are not able to smooth out," Kaplan said, adding, "Some force, something we don't understand, may be moving Neptune or Uranus around."

## Working Hypothesis

"It is only a working hypothesis," Kaplan said. "There is some evidence that some of the signatures [wave-like patterns] in the data could be explained by a 10th planet. However, this is not locked up tight," he added.

In an article in *Science News*, Robert S. Harrington and Thomas C. Van Flandern of USNO asserted that a planet with two to five times the mass of the earth could produce the observed irregularities if it is currently at a distance of 50 to 100 astronomical units from the sun.

When Pluto was discovered, astronomers initially assumed it was the planet responsible for the irregularities in the outer planets' orbits. However, it has become increasingly apparent within the past 20 years that Pluto was not large enough to explain all of the problems.

At a recent meeting of the American Astronomical Society, the USNO discussed the fact that Galileo in 1613 observed Neptune, although he thought it was a star at the time. This early observation may prove helpful in improving the precision of the prediction of the location of the hypothetical new planet.

The goal of further research is to predict the direction of the hypothetical new planet accurately enough to be able to photograph and discover it, if it exists.

# Correction

Last month's Industry Spotlight on Graphics [CW, Feb. 23] highlighted reports from International Data Corp. (IDC) and Strategic Business Services, Inc.

The IDC report, "Computer Graphics: The Business Applications Market," is priced at \$2,500 and is available from IDC at 214 Third Ave., Waltham, Mass. 02154.

The report from Strategic entitled "Issues and Opportunities in Color & Graphics" is priced at \$950. The company is located at Suite 215, 4320 Stevens Creek Blvd., San Jose, Calif. 95129.

## Tied to Satellite Transmissions

# Bell Warns Users of Coming Data Traffic Delays

By Brad Schultz

CW Staff

Integrity and throughput problems may plague AT&T data communications customers in coming months as the common carrier begins bouncing long-haul traffic off satellites in outer space.

Since 1979, Bell has alerted many users to this situation through "Dear Customer" letters that warn of data traffic delays arising from the 46,000-mile journey transmissions will make from earth station to earth station as well as echo problems should terrestrial delays be less than smooth.

Bell customers were warned that Bell 201, 202 and equivalent modems are especially sensitive to echo troubles that may trigger a rash of data communications systems aborts. A substantial number of presently installed modems fall into this class.

Customers of Atlanta-based Southern Bell should change or replace their suddenly unsuitable equipment, make "recommended software/firmware modifications" and adapt data network expansion plans accordingly by December 31, according to a letter they received from Southern Bell staff manager Patricia Eidson.

That letter said Bell 208B and equivalent modems may be adequate with "the latest echo control devices," but such modems not configured with these devices "may encounter difficulty." Full-duplex modems should not be disturbed by the transition-to-satellite links, the letter maintained.

Letters like the one from Eidson have told Bell customers that satellite circuits will support much of their Message Telecommunications and Wide Area Telecommunications Services (Wats) usage, an informed observer told *Computerworld*.

The form letters have emphasized that responsibility for making the needed hardware, firmware and software changes lies with the customer, not Bell. "During this transition period, the Bell System will advise and assist you in minimizing any effects on your data system," Eidson wrote Southern Bell users.

"In the event difficulties are encountered," she said, "you should immediately report them in the normal manner. Working closely with members of your staff, we will assist in identifying the source of such problems and provide appropriate recommendations."

### Absolute Deadline

The customer must handle such matters as modifying protocols to allow for satellite propagation delays, the Southern Bell letter continued. Dec. 31 was put as the absolute deadline for any modifications, including firmware rewrites, even though such projects normally take many months, would impose abrupt changes in user budgeting and allocation of personnel and resources and would force many users to seek outside consulting.

According to independent management consultant Belden Menkus, many data communications users that rely on Bell's Message Telecommunications and Wats offerings cannot afford taking the measures Bell claims they must make to avoid costly disruptions.

For that matter, Bell itself has shown poor capacity for shifting much of the public telephone network to satellite circuits, the Middleville, N.J. consultant remarked. The fact that Bell has not offered a medley of satellite propagation delay compensation units, which are available from other companies such as American Satellite Corp., and easily-installed devices to deter echo problems demonstrates the carrier's predicament, he asserted.

Bell spent half a century learning how to pull copper reliably through voice cables, Menkus said, and now finds itself rushing to market the very dynamic technology of data communications. Significant as Bell is to data

communications, the carrier still draws most of its awesome revenues from voice and has not allowed its data side to adequately prepare customers for problems such as satellite propagation delays, the consultant maintained.

Traditionally, Bell has not made service of equipment that terminates lines — telephones, usually — a major focus of overhead dollars, mainly because telephones have been simple devices, mostly installed in residences and seldom in constant use, Menkus pointed out. Instead, the carrier has focused service dollars on resolving problems between terminations — along the lines that pass switching systems transparent to the customer as they skirt the

nation.

Now, however, many of those lines terminate in computer systems, front-end processors, peripheral controllers and other DP hardware via modems, many of them sold by Bell. Bell lacks sufficient manpower and resources to suddenly rush service crews to modify those modems and other Bell products for satellite support, Menkus claimed. It does not have such crews.

Bell warned customers to expect one-way transmission delays as long as 350 msec on some satellite links, an expert told CW. Depending on the type of protocol involved, these delays could greatly decrease data throughput efficiency.

(Continued on Page 8)

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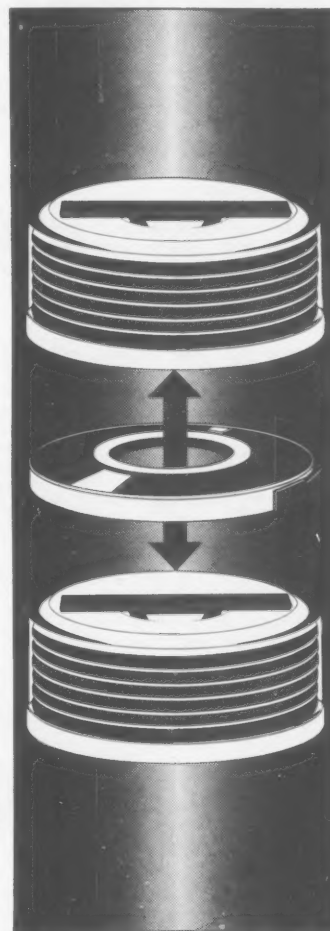
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CW 3/23/81



## Microdata Enters DDP Market With British Unit

(Continued from Page 1)

cessing terminal, 10M bytes of on-line disk storage, a 45 in./sec. 9-track, 800 bit/in. tape drive and a 150 line/min printer. The price: \$74,210.

A medium system may consist of 248K bytes of processing power, 15 520-char. CRT terminals, three 2,000-char. processing terminals, 20M bytes of on-line storage, a 45 in./sec. 9-track, 800 bit/in. tape drive, one 165 char./sec printer and one 300 line/min printer. The price: \$124,150.

A large system may consist of 424K bytes of processing power, 30 520-char. CRT terminals, five 2,000-char. terminals, 30M bytes of disk storage, a 45 in./sec. 9-track, 1,600 bit/in. phase-encoded tape drive, one 165 char./sec printer and two 300 line/min printers. The price: \$194,760.

All programmable computing elements in the system are interconnected by the Dataway, which provides high-speed data access and data transport between the systems' computers, operating software and disk-stored data base, a spokesman said.

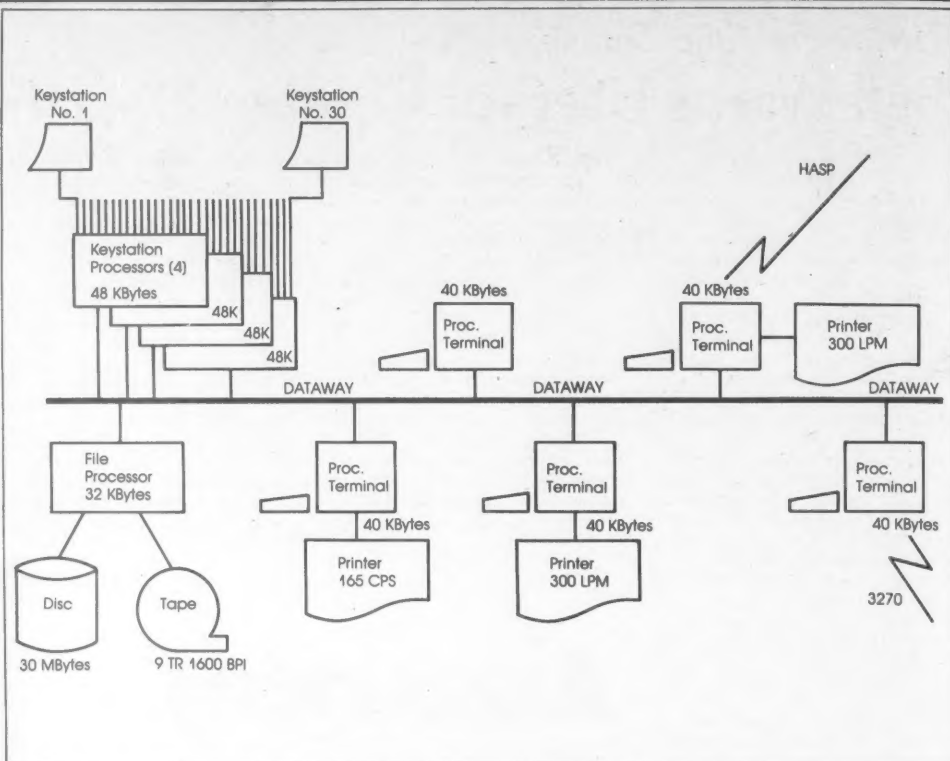
The Dataway unites all components in the system and allows individual tasks to be performed without interruption or interference from other interconnected computers, he added.

### Processor Uses

Processors in the system may be used as:

- File processors. To access and maintain on-line disk files, archival files and operating software.
- Keystation processors. To control data entry and real-time validation, calculation or lookup functions. Up to eight data entry keystations may be controlled. Up to four keystation processors may be attached to the Dataway, providing 32 data entry stations.
- Processing terminals. For batch and interactive applications; local inquiries and reporting; system control and user program development and maintenance.

When used as communications processors, the computers located within



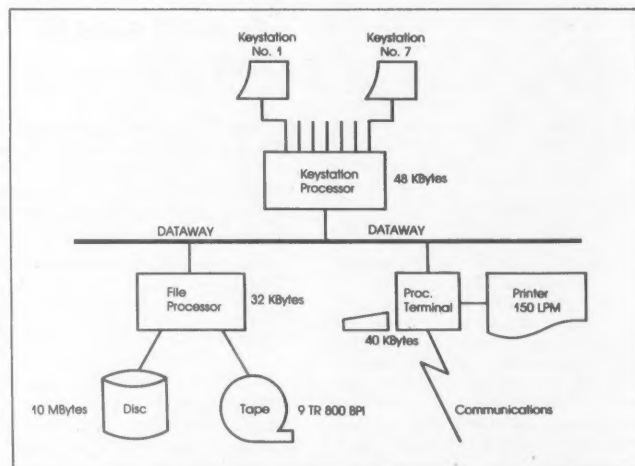
Large Sovereign System Configuration

the processing terminals will control transmission and receipt of data between remote mainframes and other computer systems, the spokesman said.

IBM batch emulation software is available for IBM 2780, 3780, 2770, 3741 and Hasp workstations. Remote interactive communications processing terminals can emulate IBM 3277 terminals and can be switched to a remote 3270 on-line to a remote IBM mainframe, the spokesman claimed.

An English Command Language (ECL) for nontechnical users without programming experience is offered. ECL is terminal-oriented and can reportedly function for on-going system control, batch handling, user application programming, file management, data base inquiry and data communications.

Microdata Corp. is located at 17481 Red Hill Ave., Irvine, Calif. 92714.



Small Sovereign System Configuration

## IBM Postpones First Shipments of 3380 Drives

(Continued from Page 1)

and a dual-density version that is roughly similar to the 3380, but both are becoming scarce. To make matters worse, it takes two 3350s to equal one 3380 and that further drains the market, analysts said.

PCMs like Memorex Corp., Control Data Corp. and Storage Technology Corp. (STC) have been swamped with calls about 3350-type replacements. Both Memorex and CDC said 3350 inquiries started to pick up in the beginning of February. A Memorex spokesman added some large IBM clients are now looking for plug-compatible hardware.

The used- and third-party leasing markets for 3350s are also booming. Users who got early deliveries on 3350s from IBM and are now trading those machines in on double-density versions from the PCMs can report-

edly get more than they originally paid for the drives. Gartner Group analyst David Stein said one of his clients reportedly made \$200,000 by selling 3350s to a third-party leasing firm.

"The market has never been this tight," Stein said, claiming the 3380 delay is one of the biggest blunders IBM has ever made. "It's a gross and obvious management failure," he said, claiming this delay has far more serious implications than similar delays announced on IBM's System/38 and 8100 processors.

For IBM the implications could be serious since the PCMs have the potential to take over the 3350 market. But Stein said the PCMs were not prepared for the IBM delay and therefore have not increased production of the 3350-type drives to fill the demand.

Memorex, at least as of last week, was still offering 60-to-90-day deliv-

eries on its 3350-type drives. CDC, however, increased its delivery schedule from 60 to 120 days on some 3350-type drives, saying orders have increased sharply since the beginning of the year. The CDC spokesman said 3350-type production has been increased. STC would not say when it could deliver 3350-type drives, but a spokesman said it now takes longer to get 3350-type drives than it did six months ago.

### Tape Drives

Stein said the 3380 delay may also impact IBM's pending announcement of a new tape drive — which analysts had expected late this month or early next month. IBM may announce a 3350-compatible tape drive soon, but the 3380 tape may be delayed, Stein said.

Both analysts and industry sources

agreed IBM's problems with the 3380 have come in moving the 3380 from research and development to mass production. Since several orders of the disk drive have already been delivered to beta test sites, sources said the drive probably works as IBM announced last June. But the thin film media required to support the high bit-packing densities on the 3380 is difficult to make and IBM may be having either a quantity problem on the media, a quality problem or both, one PCM said.

"Five or six Phi Beta Kappa engineers can build one of anything," one PCM noted. But shifting that technology to mass production can be a problem.

Stein, who contended the 3380 delays will go down as one of the firm's more serious mistakes, theorized the decision to announce the 3380 last June was a miscalculation on the part of someone in middle management.

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# 'Mediocrity' Blamed on Programmer Shortages

By Jeffrey Beeler

CW West Coast Bureau

**PALM SPRINGS, Calif.** — Mediocrity abounds in the systems field because most computing departments are so desperate for technically trained personnel that "they'll hire almost anybody who can fog a mirror," according to Tom Lutz, education director for ITT's Software Technology Center.

Many systems people are simply "unqualified" to do their jobs and prove more of a hindrance to computing-shop managers than a help, Lutz said last week at Spectrum International, Inc.'s fifth annual users group meeting.

Lutz blamed the computing field's widespread "mediocrity" on the acute and growing demand for effective programmers. By the end of last year, he said, the U.S. demand for programming talent totaled roughly 250,000 individuals, and by 1985, the figure is expected to rise more than threefold to 800,000.

This rapidly escalating need for skilled programmers has thrown the computing field into a "crisis" and has resulted in an almost overwhelming backlog of undeveloped user applications, Lutz said in a March 17 address outlining the key traits of a true systems professional.

To keep pace with the business world's increasing demand for on-line systems, the computing field will have to boost its productivity by 300% to 500%, he said. Only 10% to 15% of this needed improvement in systems operations will stem directly from productivity aids. The rest of the increase will have to come from systems people themselves.

"The key to the systems field's future success lies not in hardware, software or even methodologies," Lutz said. "The key, rather, lies in people."

## Computing as Profession

Unlike law, medicine and a few other disciplines, computing has yet to achieve professionhood in the strict sense of the word, and although some systems people can justifiably call themselves professionals, many others fall woefully short of the necessary qualifications, Lutz said.

"Because business and industry are so hard up for warm bodies with technical training, a programmer or other systems person can easily get by with mediocrity, and many do," Lutz said.

In Lutz's view, one of the key attributes that distinguishes bona fide computing professionals from their mediocre coworkers is personal integrity.

"As systems people, you have a responsibility to examine problems and present honest analyses," even if the conclusions mean risking dismissal or suffering executive disfavor, Lutz told his listeners. "One of your jobs is to slay sacred cows. Don't just tell management what you think it wants to hear. Shoot straight."

Another indispensable trait of a true

computing professional is a readiness to subordinate the interests of the systems department to the interests of management and other nontechnical users. "Systems people are the servants of the users, not the other way around," Lutz said. "Real systems pros always 'think user.' They don't expect users to 'think systems.'"

## Third Man

A third mark of genuine systems professionalism is the ability to translate technical jargon and concepts into the language and thought of business. Computing people have to master the knack of communicating with business managers on a level the executives can understand, Lutz said.

In proposing the elimination of an

old system or the creation of a new one, for example, computing personnel have to be able to explain how the recommended installation will benefit the overall organization, especially its net profits, return on investment and earnings per share.

Trus systems professionals are also characterized by a constant willingness to give their best effort and by an aptitude for logic, a continued desire to learn, solid knowledge of computing, openness to new ideas, respect for authority and respect for coworkers. In addition, systems pros thrive under pressure, always finish their assignments, participate in professional societies, work patiently with users and show an "objective understanding" of where computing fits in the overall corporate scheme of things, Lutz said.

## Computers as Mind Amplifiers

# Hammer Predicts 'Knowledge Workers'

By Bob Johnson

CW New York Bureau

**NEW YORK** — The "knowledge worker" or the "processor of information" will be the worker of the future, according to Dr. Carl Hammer, director of computer sciences for Sperry Univac in Washington, D.C. Hammer delivered the keynote address here at the spring conference of USE, Inc., a Univac users group.

Discussing society's transition from its primitive beginnings to the present, Hammer cited the economic wealth accumulated from the industrial revolution as the conduit into the "information age."

"Data and information have become more important than machines," he said. Mechanical devices of the industrial age were muscle amplifiers, which allowed humans to produce more effectively; but the computer is the "mind amplifier of present society," he said.

Hammer noted that the information worker will be in society's forefront and the employment outlook for them will brighten dramatically. He added that the industrial worker will eventually be replaced by machines and robotics.

Turning to the office of today, Ham-

mer said that productivity within it is somewhat low because of the nature of office work. There are loopholes and unknowns that occur, which do not allow for optimum productivity, he said. "The office worker of today thinks, writes, goes to meetings, talks on the telephone and travels — but rarely talks directly to his customers. Communicating with customers is something he should do," he noted.

## Hierarchical Mistake

The fact that most corporate organizations have hierarchical structures that do not allow customers to find a focal point where information is held is a mistake for the office of today, Hammer noted. He added that too many interfaces and layers must be penetrated before hard information can be located. He blamed management for not standardizing the work flow from the top positions down so as to cut through the information block.

The manager of information or management information systems (MIS) manager does not manage information; he manages data, according to Hammer. He said that patterns are revealed by data, but information and its use occur in the human brain. "The management of data is important, not the management of information. Decision support systems that allow managers to extract relevant data for their

own purposes must be developed," he said.

The office of the future should make machines do the bulk of procedural work that is now done by hand, such as filling out expense reports, Hammer pointed out. Internal communications, procedural networks, flexible organizations, overhead reduction and an information "ombudsman" or middleman are all aspects in his model structure for the future office.

Hammer also stressed that the future office will have to have access to its own data bases and that office machines must be able to access data from all over the country. An "information economy" will emerge with new social forms, according to Hammer, adding, "He who has the data, has the power."

Institutional changes, a redefinition of work patterns, and accounting for the cost of new machines will be more complex and are all waves of change that he expects.

"The world has no great surprises for computer progress," said Hammer. "There will be an evolution, not a revolution in the near future. There will be little in new technology, better, but not radically different," he said.

"The emphasis should be on trying to find a way to make life more bearable for the office worker who is suffering from paperwork. Make human use of human beings," he concluded.

## Bell Warns Customers of Delays As Satellite Transmission Begins

(Continued from Page 5)

ciencies, he said.

Those using IBM's binary synchronous communications (Bisync) data link protocol, which employs a stop-and-wait error-control technique, may find it takes 700 msec for a block of data to traverse a 46,000-mile satellite link and an acknowledgement signal to cross the same link in the opposite direction, telling the sender whether the block arrived with errors.

Sufficiently high bit error rates could force a significant number of blocks to be retransmitted, the expert noted. In conjunction with the satellite propagation delays Bell said may occur, the flurry of retransmissions could render satellite communications less efficient

than traditional terrestrial circuits.

Bell's satellite propagation delays could send back acknowledgement signals that get mixed with data blocks awaiting transmission, so data "echoes" when those blocks are sent. An acknowledgement signal is a portion of the data block it acknowledges, the expert explained. The sending modem compares the signal with its memory of a portion of that block and assumes no error occurred if the signal matches the remembered data.

A number of users have reportedly begun analyzing how they might meet Bell's New Year's Eve deadline and at least one vendor, Texas Instruments, Inc., is probing the situation on behalf of its customers, CW has learned.

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# Academicians Lured to Industry

## Short on Teachers, School Cutting Enrollments

By Brad Schultz  
CW Staff

MADISON, Wis. — Industry has lured so many computer scientists away from academic careers that some institutions, such as the University of Wisconsin (UW) here, are limiting computer science enrollments and may compel students to train on punched cards rather than interactive terminals.

UW-Madison is by no means unique in this regard. Across the nation, computer scientists are migrating from academia to more lucrative positions in industry, while computer science enrollments skyrocket [CW, March 16].

To maintain manageable faculty/student ratios, a number of institutions may become more selective about who will sit in computer science classrooms. While possibly raising the quality of computer science graduates, restricted enrollments could also exacerbate the present shortage of people qualified for jobs as programmers and analysts.

UW-Madison has about 240 graduate students in computer science compared to fewer than 80 undergraduates, according to department chairman Lawrence H. Landweber. Some 30 faculty members are on hand, of whom 20 are "full-time equivalent" instructors, the professor told *Computerworld* last week.

The number of students taking computer science courses at UW-Madison has doubled in six years, partly because a number of academic disciplines have made familiarity with computing a graduation requirement, Landweber said. To cut growth in graduate-level enrollments, his department will require applicants to be eligible for financial aid through grants and scholarships.

Such eligibility, in turn, generally requires the applicant to have a better combination of grade records, entrance examination scores and letters of recommendation than UW's normal universitywide standards for admission to graduate standing.

### Limited Class Sizes

To date, UW-Madison's computer science department has limited enrollment in only a few courses. For the first time, some students were turned away from an introductory computing course this year, students who failed to show up for the first meeting were "disenrolled," and enrollment in several graduate courses was frozen before class size got out of hand, Landweber said.

Further limits on enrollment in computer science will be set as students continue trying to cash in on the nation's booming demand for computer scientists, he predicted.

Still, most graduate students in computer science indicate little interest in DP careers, the department chairman pointed out. Only two of UW-Madison's latest batch of computer science Ph.D.s have taken academic jobs, he noted, but most of the other 20 new Ph.D.s are continuing research interests in industry, rather than involving themselves in commercial DP applications.

The four leading employers of UW-Madison's computer science Ph.D.s are Bell Laboratories, Hewlett-Packard

Co., Intel Corp. and Sperry Univac, Landweber stated. Virtually all who graduate from UW-Madison with a master's degree in computer science take jobs in systems development, as do about half the computer science Ph.D.s, he added.

This systems development generally entails creation of data base management systems, computer architectures, language compilers, operating systems and very large-scale integration (VLSI) circuits, rather than applied commercial software packages and other DP paraphernalia.

Landweber noted that many American computer science professors are demoralized by the widening salary

gap between research positions in academia and industry. Few academic computer scientists earn more than \$30,000 annually while they could easily earn up to twice as much working as industrial researchers, he estimated.

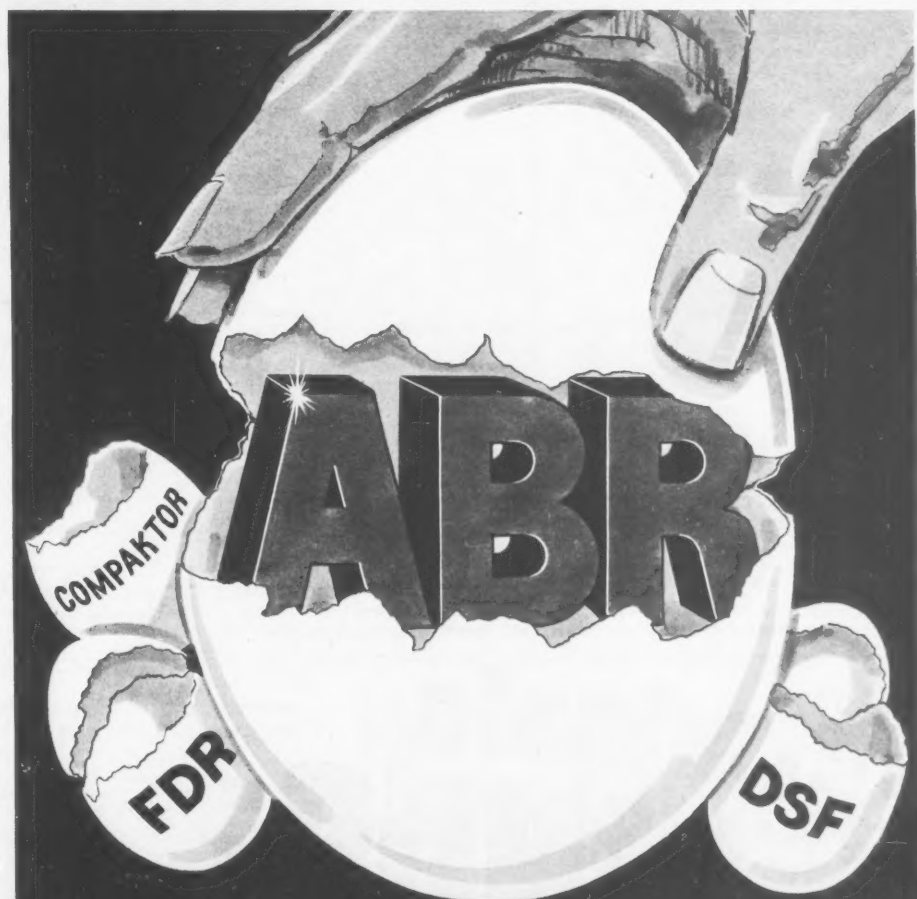
Despite the budget crunches now afflicting most state universities, UW-Madison's administration "has been very generous," Landweber observed. His department has enough teaching assistant positions to offer; problem is, not enough people are qualified to fill them.

As is true of many American computer science departments, the one at UW-Madison has sufficient computing power available for teaching; how-

ever, not enough terminals are available to make the CPU generally accessible. "That means students find themselves lining up at 2 a.m. to gain access to a terminal late in the semester," when deadlines for programming projects come due, he remarked.

Landweber hoped appropriations for construction will come by the 1983-85 timeframe. "Unless we are given an emergency allocation [of space] in the fall, we will either have to curtail enrollment or go back to students using punched cards," he said.

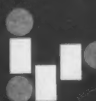
As an alternative to interactive CRT terminals, punched cards are about as popular with computer science majors as leukemia.



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# 'Fortune' Survey Finds No Loss

By Tim Scannell  
CW Staff

NEW YORK — Are most major companies distributing their computers

more but enjoying corporate control less?

Not at all, according to a comprehensive study on distributed data process-

ing (DDP) released recently by Fortune magazine's market research department.

The study, entitled "DDP Deci-

sions," found that while most companies switched from a centralized to a DDP environment to increase local user responsibilities and off-load the host system's pressures, they did it with an eye toward retaining the centralized corporate grip. In fact, the two most important objectives and requirements for adopting DDP were to maintain centralized control and allow the remote sites to access central-site software, the survey showed.

Although the magazine's research originally began with 1,073 companies that had the hardware potential for DDP, the study eventually wound up with only 83 corporations that met certain preestablished criteria. All of the companies used in the study have annual sales ranging from slightly more than \$100 million to more than \$12 billion. Also, all of these companies migrated to DDP after 1976 and had remote, interactive minicomputers or intelligent terminals; maintained local data bases; and generated reports locally, the study said.

## Reasons for Change

An important part of the survey was that executives from each of the companies involved remember what happened during the firm's change from a centralized to a decentralized operation. Specifically, the researchers wanted to know what motivated each company's management to make the change and what rules of the road were established before the final decision was made.

Besides increasing local responsibilities and relieving the host computer, the majority of the companies in the study believed DDP would decrease time requirements, improve turnaround time and reduce that bugaboo of all computing facilities — cost. Only 12% of the surveyed firms thought DDP would improve input accuracy, and 8% saw it as a route to better customer service.

While central corporate control and access to central-site software were the two top requirements — with 37% and 32%, respectively, rating them as extremely important — there were other prior objectives listed as necessary to a successful DDP environment.

For instance, nearly 50% of the respondents saw reducing dependency on a single computing source as highly important, while 32% ruled that direct communication between remote sites was a major concern. About 36% of the firms said that adding computer power gradually through DDP, rather than buying before a firm's time, was also highly important.

Surprisingly, 30% of the respondents reported that accessing remote data bases from a central site was not very important as a pre-DDP consideration. However, the majority of the users felt this was a crucial point, with about 53% putting their check in the "important" column.

Focusing on the smoke-filled rooms behind the final DDP decision, the Fortune study explained that while in virtually all the companies polled both DP and non-DP personnel were in-

## RELATIVE IMPORTANCE TO INVOLVED PERSONNEL OF SPECIFIED DDP OBJECTIVES AND REQUIREMENTS

	Weighted Score (Range: 4-0)*	Percents read across					
		Rating Distribution					
		Extremely Important	Quite Important	Fairly Important	Not Very Important	Not at All Important	No Answer
Reducing dependency on a single computing resource	2.35	20%	27	23	21	6	2
Having direct communication between remote sites	1.94	20%	12	12	23	17	2
Accessing information or software from the central site for use at remote sites	2.77	32%	32	20	11	4	2
Accessing remote data bases from central site	1.80	8%	25	20	30	15	2
Retaining centralized, corporate control	2.77	37%	21	21	17	2	2
Adding computer power gradually rather than buying in advance of need	1.97	6%	30	27	22	12	3
Reducing load on mainframe to gain more central, mainframe resource	1.97	10%	26	27	23	12	2
(Total respondents asked the question = 100%)**	(113)						

Note: Percents may not add to 100% because of rounding.

\*Based on weighted distributions of those answering.

\*\*This question was not included in the earliest questionnaires.

Q. Listed are various possible objectives and requirements your company may have had in deciding to distribute some data processing applications. Please check how important each was to you personally.

Reprinted from "DDP Decisions," a Fortune market research survey.

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# of Corporate Control in Move to DDP

involved, DP people accounted for only 38% of the total.

## Key Non-DP Roles

Although DP personnel were more frequently involved in the decision, acquisition and vendor-related stages of the DDP game plans of each company, non-DP people also played significant roles, especially in the crucial stages before a vendor was contacted and a deal inked. For instance, 74% of the non-DP executives and lower echelon workers claimed some involvement in initial DDP discussions, while more than half said they recommended sites to have local processing and approved decisions to distribute processing operations, the report stated.

In fact, 49% of the non-DP people polled admitted they had a hand in determining the degree of centralized control over distributed processing operations.

In any successful venture or project — be it companywide DDP or accurate speculation on the price of pork bellies — there are a number of individuals

who stand out as champions of the cause. In *Fortune's* case, 93% of the companies involved reported that an individual or group of individuals were responsible for sparking the DDP idea. In fact, a whopping 52% of the DP and 48% of the non-DP people freely admitted that it was their hand that was responsible for building the company's DDP empire.

## Not Leaders

About 15% and 26% of the DP and non-DP workers, respectively, said they were not leaders in the DDP push; and about 8% from both camps reported no heroes in their corporate ranks.

In other portions of the survey, the respondents chose local maintenance and support as the most important criteria for vendor selection, followed by systems reliability, expansion compatibility and operation software quality. Surprisingly, experience with a particular user's industry was rated as not very important.

## WHERE WERE THE DDP CHAMPIONS LOCATED?

	Companies
Companies in which one or more DDP champions were reported	93%
<b>DP Functions</b>	84
Top management	13
Middle management	79
Staff	12
<b>Non-DP</b>	77
Top management	69
Middle management	33
Staff	4
(Total companies = 100%)	( 75)
(Total questionnaires analyzed)	(200)

Note: Multiple answers.

Reprinted from "DDP Decisions," a *Fortune* market research survey.

Q. What were the specific job titles, at that time, of the (other) people who were particularly instrumental in arguing for distributed data processing?

## WHO FINALLY AUTHORIZED THE MOVE TO DDP?

	Companies
<b>Top Management (net)</b>	91%
Board of Directors, board officers	17
President	40
MIS steering committee, committee of top management, task force	33
Executive/Senior/Division/Group Vice President	10
Vice President-MIS	9
Vice President-Finance, Chief Financial Officer	10
Vice President-Controller, Controller, Treasurer	10
Other top management	11
<b>Middle Management (net)</b>	17
Director of MIS/DP	16
Other middle management	1
General conclusion, gradual process, it just evolved	7
Don't know	6
(Companies asked the question = 100%)	( 70)
(Total questionnaires analyzed)	(231)

Note: Multiple mentions.

Reprinted from "DDP Decisions," a *Fortune* market research survey.

Q. Who finally authorized the move to distributed data processing?

On the systems side, IBM was rated by both DP and non-DP personnel as most adept at the intricacies of DDP. IBM also led the vendor pack as being above average on hardware technology, software technology and systems reliability. However, Digital Equipment Corp., which was an often distant second to IBM in every category

of the vendor portion of the survey, topped IBM by a wide margin on competitive pricing.

Copies of the *Fortune* survey can be obtained for \$10 singly or \$8 for 25 copies or more from the magazine at Room 806B, Time & Life Building, Rockefeller Center, New York, N.Y. 10020.

## PRIMARY MOTIVES FOR INSTALLING DDP

	Companies
Local responsibility, need for user involvement, improve local support, place responsibility for correct data with users	50%
Decrease time requirements, better turnaround, improve timeliness of reporting	29
Off-loading host, more efficient utilization of resources, reduce size of central work force/work load	27
Cost effectiveness, reduced cost	24
Increase accuracy, improve input accuracy	12
Some applications needed only at remote sites, diversity of businesses and geographic locations	9
Maintain central control of local applications	8
Better customer service	8
Make use of telecommunications	6
Redundance in data	6
Flexibility	6
Take advantage of new technology advances in hardware/hardware costs/software packages, etc.	6
Ease of operation at remote sites	3
Provide online/remote inquiry capabilities	3
Improved data processing (unspecified)	9
Miscellaneous other motives (single mentions)	24
(Companies asked the question = 100%)	( 66)
(Total questionnaires analyzed)	(129)

Note: Multiple mentions.

Reprinted from "DDP Decisions," a *Fortune* market research survey.

Q. Please explain briefly the primary reason or motivation in your company's case for distributing responsibility for some applications.

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## Air Controllers Begin 'Informational' Picketing

By Marguerite Zientara  
CW Staff

WASHINGTON, D.C. — As a possible prelude to a rumored illegal strike [CW, Oct. 13, Oct. 20], U.S. air traffic controllers last week initiated "informational" picketing by off-duty union members at airports and Air Route Traffic Control Centers (ARTCC) around the country.

The action began the day the Professional Air Traffic Controllers Organization's (Patco) contract with the Federal Aviation Administration (FAA) expired, and about a month after Patco-FAA negotiations began.

The group made the move March 15 "to let the aviation-oriented public know that controllers are working without a contract and that the FAA has not agreed as of this time to provisions we'd like in our new contract," explained Mike Simons, director of air safety for Patco.

Besides grievances regarding pay scales, length of their workweek, staffing levels and the right to join labor organizations, controllers are acting in protest against what they have long called the "antiquated and unsafe" computerized air traffic control system.

### Current Situation

The system, based on third-generation IBM 360/65 computers in ARTCCs, reportedly is subject to

frequent breakdowns that lead to confusing and potentially dangerous transition periods between the primary and radar-based backup systems. It is during these transitions that a controller could lose track of his airplanes, greatly increasing the chance of a midair collision, Patco has claimed.

The current FAA schedule calls for upgrading the computerized control system beginning in 1986, with a target finishing date of 1992, a schedule that Patco fears could be too late to avert a major computer-related air disaster.

"The FAA consistently ignores the working controller when it designs, maintains or fails to maintain its equipment," Simons charged. "The FAA has 14,500 to 14,700 controllers who work with that equipment every day and are probably at least as well qualified, if not better, than most people to comment on how it works, how it ought to work or how it could be designed better. Yet the FAA systematically ignores these people when they design systems."

Patco essentially is asking the FAA to support recent legislation introduced by Rep. William Clay (D-Mo.) that would give controllers an across-the-board wage hike with cost-of-living increases, would reduce the workweek from 40 to 32 hours and would bolster retirement benefits.

## Controversial Merit Plan Could Net 14% Bonuses For Mississippi DPers

By Bruce Hoard  
CW Staff

JACKSON, Miss. — State DP workers here are taking part in a controversial merit pay plan that could net them individual bonuses of up to 14% of their newly increased salaries.

The plan, which is designed to stimulate employees and raise their productivity, will cover all Mississippi state workers. Here's how it will work: The state is contributing a "kicker," representing 7% of the total state payroll, to a special bonus pool. On July 1, agency department heads and supervisors will be authorized to disburse the money in the form of bonuses of from 1% to 14% of workers' salaries based on their individual work performance during the previous six months.

Although some detractors argue the entire plan is susceptible to the rampant political patronage that frequently pervades state government, Frank Stebbins, executive director of the central DP department, is thrilled with the idea.

Stebbins, who will dole out bonuses to deserving DP recipients, sees the idea as a shot in the arm for everyone concerned. "What it means," he said, "is that each person is going to be on his own to merit any kind of increase at all, whereas the good, bad and indifferent were all awarded the same way before."

The exact criteria for awarding bonuses has yet to be established, although the general structure will be based on management-by-objective planning, he added.

### 'The Greatest'

The 52 people under his purview, most of whom are programmers and analysts, are also happy with the merit system, he maintained. "They think it's the greatest thing since sliced bread," the director commented.

One of the reasons the state DPers are welcoming the idea with open arms is because it includes a substantial, across-the-board salary increase for them.

A special blue ribbon committee was recently mandated by Mississippi governor William Winter to study state DP salaries, and it recommended they be raised in order to make the state more competitive with private industry.

That means the \$13,620 previously earned by entry-level DPers with a B.A. in computer science will be upped

to \$16,550. Sweetening the pot even more is the possibility of an additional 14% bonus, which would bring the original \$13,620 up to a more respectable \$18,827.

"This gives us the means of really going through and giving fair evaluations," Stebbins declared.

But it is the means of evaluation that worries some observers. Edwin Kerr, executive vice-president of QED Information Sciences, Inc., claimed those evaluations are much more easily said than done.

"I've got news for them," he commented. "It is a very, very difficult task because of the nature and variety of things done by people in this [DP] profession."

Kerr called the plan "unique," but asked, "How do you establish the criteria for measurement?" There are so many variables that straight management-by-objective guidelines will be nearly useless, the executive vice-president maintained.

"Lines of code are meaningless," he said, echoing a popular sentiment. The idea of analyzing the work of a systems analyst who defines problems and a programmer who solves them is just not reasonable, he noted. "There are too many levels of performance criteria."

There is also the question of responsibility, he added, saying a workable system may result from a great manager and a mediocre technical team, or vice-versa.

### Little Chance

Dick Brandon, president of the Brandon Consulting Group, Inc., gave the plan little chance of success. "It's a wonderful concept, it's been tried before and it won't work in data processing," he declared.

He joined Kerr in condemning lines of code and talked about a software house that decided to pay its employees based on merit 10 years ago. "They went out of business, literally dropped off the face of the earth," he observed.

As for trusting programmers to do their best work without cutting corners when shortcuts lead to more money — don't, he suggested. "Programmers' whole mission in life is getting around things," he asserted.

Brandon summed up his feelings on the merit pay plan for DPers succinctly: "What the state of Mississippi is going to do is, pardon my French, bullshit."

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# At Least \$1.3 Billion a Year GAO Hits Federal Outlays for Software Upkeep

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — The federal government is spending at least \$1.3 billion a year to maintain its vast inventory of software, the General Accounting Office (GAO) estimated in a recent study, adding that "software maintenance in the government is now largely undefined, unquantified and undermanaged."

With the federal software inventory valued at about \$25 billion and with federal agencies spending another \$6 billion a year, the GAO — the auditing agency of Congress — is understandably concerned about this lack of management control over spiraling maintenance requirements.

To quantify the problem, GAO visited 15 federal DP installations and surveyed more than 400 others. It found that Cobol applications programs last an average of 5.4 years, Fortran programs an average of 4.8 years and the life of the oldest application programs at 399 responding sites averages about 9.4 years.

While the study concluded federal software development and maintenance practices are not dissimilar to those of private industry, GAO expressed serious concern that federal DP managers are not doing enough to control maintenance costs. In most cases, the study said, managers have not even developed a clear working definition of what maintenance includes.

"In some cases, we found inconsistent definitions of software maintenance within the same agency," GAO said. Some installations define modifications to existing software as development instead of maintenance. At some sites, only defect removal is considered maintenance.

## No Identification

In general, GAO said, "government managers were not managing software maintenance as a function. That is, maintenance processes were not identified, grouped, documented and reported so that management could have a comprehensive picture of the installation's total software maintenance efforts."

"Without such a picture, it is impossible to measure performance. If performance cannot be measured, poor utilization of resources can go undetected for long periods, resulting in failure to meet objectives."

"Also," GAO said, "management has insufficient information to help it decide to correct perceived deficiencies. This absence of definitions, cost records and goals or standards makes it virtually impossible to manage software maintenance as a function."

To remedy that, the report recommended the National Bureau of Standards (NBS) and the General Services Administration, central oversight agencies for federal DP policies and practices, generate governmentwide standards for defining and measuring software maintenance, particularly in terms of cost.

"Without benefit of such standards, an installation manager has little or no basis for evaluating the efficiency and effectiveness of his present level of

maintenance," GAO said. "The lack of definitions and accounting data contribute to the lack of goals."

The report added that targeting several key problem areas can help reduce maintenance costs. For example:

- Excessive user-requested modifications must be controlled. "Some formal review and approval procedures are usually in place for maintenance efforts which require large amounts of resources," the report noted.

- However, smaller tasks tend to be handled informally with little management review and approval required, GAO said. In one installation the agency found a single application program with a documented maintenance

history of 158 modifications.

- "The single most beneficial effort" to reduce maintenance costs is better definition of user requirements in the systems development phase.

- Better documentation of both program development and maintenance histories is essential.

- At installations where both contractor-developed and in-house-developed software is run, most DP managers said the former required more maintenance, GAO said.

This situation results primarily from lack of a good quality assurance program on the part of the contractor during program development, the report said.

- The report said there is limited federal use of software development and maintenance tools and techniques, such as preprocessors, program analyzers, test data generators, structured programming and top-down program development.

To assist federal DP managers, the GAO report included a 10-page software maintenance checklist, offered as an interim guide while comprehensive guidelines are being developed by NBS. The checklist can be obtained by ordering the free GAO report, No. AFMD-81-25, from the GAO Document Handling and Information Services Facility, P.O. Box 6015, Gaithersburg, Md. 20760.



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## Thin Line Exists Between DBMS, Query Software

By Rita Shoor  
CW Staff

"End-user-oriented" and "high-level" are characteristics of several packages more often described as IBM-compatible data base management systems (DBMS) than as query software.

The integrated query facilities of products from Mathematica, Inc.'s Products Group (MPG) Information

### Product Spotlight

Builders, Inc. (IBI) and Infodata Systems, Inc. offer many of the advantages attributed to query software as part of the total system, vendor representatives claimed.

But positioning such a product can be difficult, according to Dave Kemler, IBM's vice-president of marketing. Focus, the firm's DBMS, is marketed as an "information control system" that offers both ad hoc query and data management capabilities, he said. "We get pulled in [to an installation] about 50% of the time because people are looking for query software."

Business specialists who are not technically oriented can generally use the Focus query facility after a one-day manager's course, he claimed. Thus, the package fulfills the short end-user training time characteristic of high-level query software.

It also offers query storage, report generation and update capabilities, he said. But, Focus is also used extensively by programmers as a tool to cut down their application development time. And the package interfaces with several non-Focus DBMS (IBM's IMS, Integrated Data Management System (IDMS) from Cullinane Database Systems, Inc. and Cincom Systems, Inc.'s Total). This characteristic, in particular, sets the DBMS apart from straight query packages.

MPG and Infodata representatives agreed that market positioning could be difficult for their respective products. MPG's Ramis II and Infodata's Inquire and IQ/Net were reviewed last year from a DBMS perspective [CW, July 14].

However, "there is an increasing trend toward integrated products for the end-user base," according to Frank Fish, MPG's vice-president of marketing. "You cannot have a successful product today which operates in the application development area or the decision support area that does not contain three elements," he maintained. These include a DBMS, an integrated data dictionary and a high-level reporting language, otherwise referred to as query software.

Inquire costs between \$70,000 and \$150,000, depending on the system configuration and IQ/Net — strictly for the 4300 market — goes from \$50,000 to about \$85,000. Ramis II runs from \$22,000 for CPUs up to an IBM 370/148 or 4331 to \$43,000 for larger CPUs, and Focus would cost about \$43,000 with the report generator, query facility and dialogue manager, according to the vendors.

SYSTEM CHARACTERISTICS	IBM Query by Example (QBE)	Applied Data Research, Inc. Dataquery	Cincom Systems, Inc. TIS/Query	Cincom Systems, Inc. T-Ask
Operating Systems	VM/370	DOS; DOS/VS; DOS/VSE; OS/MVS; OS/VS1; OS; All IBM-Compatible Systems, i.e., Edos	All IBM OS-Type Virtual Operating Systems <sup>1</sup>	All IBM OS and DOS Virtual Operating Systems <sup>2</sup>
Hardware Environment	"All Systems From the 4331 up to the 3081"	IBM 360, 370, 4300, Series 30 and Compatible Hardware	IBM 370, 4300, Series 30 Hardware <sup>3</sup>	IBM 370, 4300, Series 30 Hardware
Average Storage Requirement	1.5M-2M Bytes Virtual Storage/User; Minimum of 1M Byte CPU Memory Also Required	20K-40K Bytes "Depending on the (TP) Monitor"	About 60K Bytes for the Nucleus; Additional 20K Bytes of Context per Task <sup>2</sup>	Nucleus Code About 40K Bytes; Runs in Overlay Structure Under Environ/1.
Communications Interfaces	"QBE Provides Its Own TP Interface Through VM/370 Control Program Services."	Datcom/DC, CICS	TIS TP Monitor; CICS Running at One Site. Formal Release Expected Second Quarter 1981.	Environ/1
Is the Query Software Tied to a Particular Data Base Management System (DBMS)?	Stand-Alone/Has Its Own Data Base Management Logic.	Yes. Datcom/DB	Yes. TIS	Yes. Series 80 Total
File Access Methods Supported	QBE Access Method for Data Storage and Retrieval. VM/CMS Used for Utility Functions.	—	—	—
DBMS Interfaces Available	Separate Extract Facility Under MVS Which Selects Data From an IMS Data Base and Formats Result for Bulk-Loading Into QBE.	Datcom/DB	Total, TIS	Series 80 Total
Is a Data Dictionary a Prerequisite for the Query Software?	No	Yes. Datadictionary Product From ADR	"Entire System Is Based on Integrated Directory Concept."	Separate Product Not Required. Dictionary Is Integrated.
On-Line and/or Batch Mode Operation?	Both. A "Batch-Like" Capability May Be Implemented Through a Linear Form of the Language.	On-Line	Both	On-Line
Report Generation Facility?	Yes	No	Yes	No
Update Capability?	Yes	No	No	No
Formal Training Provided?	Yes	No. Self-Training for the 6 to 8 Key Commands.	Yes. Usually at the User Site.	Yes
End-User Training Time	"Several Hours"	"Few Hours"	"Few Hours"	"Half Day"
Can Queries Be Stored for Later Use?	Yes	Yes	Yes	Yes
Can the Stored Query Be Updated?	Yes	Yes	Yes	Yes
Any Provision for "Subsetting" Capability?	Yes	No	No	No
Subtotal/Final Total Capability?	Yes. Capability Is Contained in SUM, COUNT, MAX, MIN and Average Functions.	Yes	Yes	Subtotals, No; Final Totals, Yes
If the Query Is Ambiguous, Will the Software Ask for Reclarification?	If Question Is Syntactically Correct, QBE Accepts It — Otherwise, an Error Message Is Generated.	No. "The Language Does not Allow Ambiguities."	Yes	No
Approximate Size of User Base	Not Available	50-60 Installations	12 Installations	100 Installations
Price (License Fee)	\$325/Mo	DOS, \$11,000; OS, \$13,000 <sup>1</sup>	Purchase Price, \$50,750. 1-Year Lease, \$1,015/Mo	DOS, \$27,800; OS, \$30,000;

1. Prices are effective May 1.

2. Storage/Task can be varied by the customer at installation time. Most customers are currently using 20K bytes.

3. Although older releases will be supported, new releases require a 370 instruction set.

CW Chart



SYSTEM	Cullinane Database Systems, Inc. On-Line/English	Informatics, Inc. Inquiry IV/IMS	Intel Corp. Query Update By Example (QUEX)	Software AG Natural
<b>CHARACTERISTICS</b>				
Operating Systems	VM/370; OS/MVS <sup>4</sup>	OS; OS/VS1; OS/SVS; OS/MVS	All IBM OS-Type Operating Systems.	All OS and DOS-Type Systems VM/CMS.
Hardware Environment	IBM 360, 370, 4300, Series 30 and Compatible Hardware	IBM 360, 370, Series 30 and Compatible Hardware	IBM 360, 370, 4300, Series 30 and Compatible Hardware	IBM 360, 370, 4300, Series 30 and Compatible Hardware
Average Storage Requirement	"Highly Application-Dependent; In the Neighborhood of 300K-600K Bytes."	Real Storage; 140K-Byte Overlay Structure; 70K Bytes	50K Bytes	99K-Byte Reentrant Nucleus; 80K-Byte User Data Area.
Communications Interfaces	TSO; CMS <sup>5</sup>	IMS/DC; TSO	CICS	Complete, CICS, TSO, Shadow II, Intercomm, Westi
Is the Query Software Tied to a Particular Data Base Management System (DBMS)?	Does Not Access Data Base Directly. Works Similarly to QBE	Yes. IMS	Yes. System 2000	Yes. Adabas
File Access Methods Supported	—	—	—	Physical Sequential non-Adabas Files and Other Access Methods via a CALL Facility.
DBMS Interfaces Available	IDMS	IMS	System 2000	Adabas
Is a Data Dictionary a Prerequisite for the Query Software?	No. But a Dictionary Is Helpful. Uses Cullinane's Integrated Data Dictionary Product.	No	No. "But it is Easier and More Efficient to Use Intel's Integrated Data Dictionary With QUEX."	If Natural Is Working With a non-Adabas File, the Dictionary Is Not Required.
On-Line and/or Batch Mode Operation?	Both	Both	On-Line	Both
Report Generation Facility?	Yes	Yes	Yes	Yes
Update Capability?	No	No	Yes	Yes
Formal Training Provided?	No. "No Real Syntax or Special Commands Required."	Yes. At User Site or Informatics Office.	Product Support Manual With a User Manual Subset Documentation and "HELP."	Yes. Classroom Training Available at Software AG Education Center.
End-User Training Time	"About 90 Seconds"	One-Day Class	Facilities Are On-Line. "About a Day to Get Oriented to Terminals and Command Options."	1-2 Days For the End User to Work With Basic Features.
Can Queries Be Stored for Later Use?	Yes. But Not Done in Actual Practice "Because of Language Structure."	Yes	No	Yes
Can the Stored Query Be Updated?	Not Applicable	Yes	No	Yes. Interactively
Any Provision for "Subsetting" Capability?	Yes. Provided the Second Question Uses a Referring Pronoun to the Original Query.	Can Create a Flat File Subset From the Data Base, But Inquire Will Not Generate Reports.	No. But There Is Navigation Capability Among Multiple Files.	Can Get a Subset of Records From One File and Match Them Against a Second File for Records That Contain Criteria Found Only in the Second File.
Subtotal/Final Total Capability?	Yes	Yes	No	Yes
If the Query Is Ambiguous, Will the Software Ask for Reclarification?	Yes	No. Language Structure "Makes It Difficult" To Ask Ambiguous Question. If Syntax Is Incorrect, Error Message Is Generated.	Not Applicable Because of Language Structure	No. But Each Line Is Checked Syntactically for Errors.
Approximate Size of User Base	7 Installations	125 Installations	5 Installations	More Than 200 Installations
Price (License Fee)	\$50,000	Model I, \$45,000; Model II (With User-Defined Output Feature), \$55,000 <sup>6</sup>	\$15,000 <sup>7</sup>	Begins at \$36,000

## Ease of Use No. 1 In Survey Of Query Users

(Continued from Page 1)

search, Inc. (ADR), Cincom Systems, Inc., Cullinane Database Systems, Inc., Informatics, Inc., Intel Corp., Software AG and IBM.

High-level query software can mean increased productivity for both the end-user departments and the technical DP staff in an organization. These end-user-oriented packages, often offering an English-like query language, solve the problem of retrieving information from the data base without adding to the information request

## Product Spotlight

backlogs plaguing many large corporations.

In effect, high-level query software puts the responsibility for getting information from the data base right back in the hands of the end user. Programmers are no longer bombarded with requests for one-time reports "right now." End users, in turn, get the information they need for their business decisions on a timely basis. And the nontechnician is spared the embarrassment of asking a programmer to recode a program because the original request was worded incorrectly.

With training times that vary from "about 90 seconds" to a maximum of one day, it becomes obvious that a primary objective of these packages is to make the end user productive in the shortest possible time.

In order to achieve this objective, the query language itself generally fits into one of two categories. It is either English-like in its structure and syntax, or it consists of a relatively small number of simple, high-level commands. Online English (OLE) from Cullinane is an example of the first type and ADR's Dataquery, with "six or eight key commands," exemplifies the second.

### DBMS Ties

Marketed primarily as query packages, most of the products are tied to the data base management system (DBMS) sold by the same vendor. The one possible exception is IBM's Query by Example (QBE). This package operates in stand-alone mode, although it offers a separate extract facility that can select data from an IMS data base for loading into a QBE file. However, the inability to interact directly with the IMS data base itself is perceived as a negative factor by most industry experts.

Because the QBE file is separate from the IMS data base, the package introduces data redundancy and additional system overhead and can lead to problems in "keeping things parallel," according to Ron Ross, editor of *Data Base Newsletter*. But, he maintained that people "in the IMS world have been literally starving for query languages for so long," they are willing to overlook these negative factors. IBM's new offering, SQL/DS, interacts with the DL/1 data base through the same

(Continued on Page 16)

4. Will operate under OS/VS1, DOS/VS, DOS/VSE in Release 2, scheduled for third quarter of 1981.

5. Will operate with IDMS/DC, CICS, Intercomm, Task/Master, Westi and Shadow II in Release 2.

6. Prices are effective in late April.

7. Priced as an option on System 2000.

## Independents React to SQL

By Rita Shoor  
CW Staff

How do the independents who produce IBM-compatible high-level query software feel about SQL/DS IBM's entry into the relational software market [CW, Feb. 9]?

Whether SQL/DS is looked upon as a high-level combination query/report generator package or the first step on the road to a relational data base management system (DBMS), it was evident that all of the software houses are keeping a close watch on IBM. "Obviously, anything IBM does is competitive," summarized Bill Rabkin from Culine Database Systems, Inc.

Interviews with nine vendor representatives, however, left the general impression that most did not view the product as any sort of threat—at least on a short-term basis.

Many of the respondents mentioned what they considered to be two major drawbacks. First, the initial release of SQL/DS, scheduled for February 1982 availability, is limited to the DOS market. And "the DOS environment doesn't take advantage of a relational model," according to the spokesman for Software AG.

The second perceived disadvantage is that SQL/DS, like IBM's Query by Example (QBE), works with the data base via an extraction facility rather than through a direct interface. This leads to problems

with data redundancy and incompatibility and is, in fact, a "very antiquated" way of handling queries against the data base, Software AG noted.

While the immediate impact of SQL/DS on the independents was not expected to be significant, the firms were less certain of how to predict the long-term effects of IBM's announcement.

Frank Fish, vice-president of marketing for Mathematica, Inc.'s Products Group (MPG), speculated that the product's official release may have been a move intended to delay the purchase of independent software by current IBM customers. However, he predicted that the long-term effect might be positive for IBM's competitors since it increased market awareness of non-procedural languages with an end-user orientation.

Software AG also called SQL/DS a "boost to the independents" and claimed the announcement signified a reaffirmation that IBM realizes it needs an alternative to IMS.

Another opinion was offered by a product manager from Cincom Systems, Inc. Rather than viewing SQL/DS as a high-level query facility, "we think IBM is delivering a prototype of the system that will eventually replace IMS and DL/I," he said. He predicted a long-term impact on the DBMS market with little or no short-term impact for query software vendors.

## Tool Helps Soothe Feelings Of Hospital System's Users

By Rita Shoor  
CW Staff

WINSTON-SALEM, N.C. — Computer software is rarely credited with soothing a person's feelings. But that's exactly what IBM's Query by Example (QBE) package has done for end users at Forsythe Memorial Hospital here.

Programmers are a scarce resource at the hospital, according to Robert Kinch, computer service manager. Increasing the technical staff size was not a viable option at Forsythe. The health care industry's financial growth is limited by government controls, he explained. Therefore, the hospital's administrative philosophy is to hold the staff, which accounts for 75% of the institution's operating costs, at a steady level.

The resulting "programmer overload" was complicated by end users feeling humiliated when they had to deal directly with the technical specialists, Kinch said.

End users are often unsure of exactly what they want to see on a report, he explained. The programmer, on the other hand, requires specific information in order to generate any kind of output. The result is that the end user often feels that the programmer is deliberately trying to embarrass him by questioning him in unfamiliar technical terms.

Installing QBE resolved many of these technician/end-user confrontations, Kinch said. The users, in effect, become part of the system. After just two hours of in-house training, end users were able to access data directly because "QBE even talks our language," he said. The high-level query

software allows end users to modify requests themselves and thus avoid the problems engendered when continual report modifications were flowing to the programmers.

The programmers are happy, too,

## Product Spotlight

Kinch noted. They "think it [QBE] is the greatest, since they don't have to do little reports," he said.

The software was implemented about a year ago on Forsythe's 4M-byte IBM 3031. Installed in an environment that includes CICS and DL/I, QBE is the "cleanest package we've ever had," Kinch stated.

QBE was not Kinch's first attempt to increase programmer productivity. Forsythe had previously tried a report writer package, but the end users still had to go through the programmers to get their information, he said.

With QBE, the programmers extract key elements from the DL/I data base to create a QBE data base that is updated on an agreed-upon preset schedule. After that, the users work directly with QBE to obtain their own reports—a process that can take as long as 30 minutes on a test machine running under VM. But the general opinion is that half-hour turnaround is "better than waiting three weeks for a programmer," Kinch said. He estimated that he had gained "three programmers—maybe more—" by installing the query package.

## Ease of Use Cited First

(Continued from Page 15)

type of extraction method, he noted (see related article).

OLE also retrieves information from the Integrated Data Management System (IDMS) data base through an extract facility. However, direct IDMS access is planned for Release 3 of the product, scheduled roughly for the first quarter of 1982, according to Bill Rabkin, director of product management.

The rest of the products surveyed interact directly with the DBMS specified on the chart. Therefore, the choice of query language is dictated very strongly by the type of data base against which inquiries are to be made. This close product integration is illustrated by the fact that Informatics is the only vendor offering a query package—Inquiry IV/IMS—that works with another vendor's DBMS.

All of the products operate in on-line mode, with five out of eight also providing batch mode capability. Although the query facility is usually of greatest interest to the potential customer, six of the packages offer a report generation facility in order to obtain hard-copy printouts of query results.

Would-be buyers would do well to review several other package characteristics, according to Ross. These include whether the system helps the user through prompting messages, whether a directory is provided and

whether the error messages are easily understandable to a nontechnician. A live product demonstration was highly recommended by industry sources as the most practical way to obtain many of these answers.

Besides a close interaction between the query software and the DBMS, these products are often highly dependent on a data dictionary or directory for efficient operation. Although most vendors did not want to specify that a dictionary was a prerequisite, IBM and Informatics were the only ones to come out with an unqualified "No" to this question.

A chart overview points up another factor unique to IBM's QBE. The package functions only within a VM/370 operating environment. While this restriction does not mean much to some users (see related article), a technical specialist from a large insurance firm stated unequivocally that his firm would not consider changing over to VM just to obtain QBE.

The company is staying with IBM's Generalized Information System (GIS) for now, he said. GIS has its own set of shortcomings, he continued. The package is designed to work with IMS and operates only in batch mode. It "tries to generate its own JCL for subsequent access and execution by a non-technician rather than being formatted by the end user himself."



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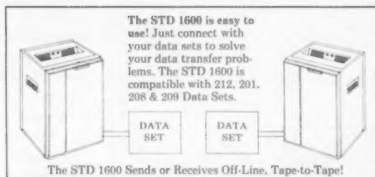
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# Might Have Aborted Launch Space Shuttle Test Uncovers Programming Error

By Tim Scannell  
CW Staff

KENNEDY SPACE CENTER, Fla. — Space engineers uncovered a minor computer programming error during last month's test firing of the space shuttle Columbia that could have caused serious problems in an actual launch.

The error, which prevented the firing of two of the shuttle's solid fuel booster rockets, consisted of inaccurate timing parameters programmed into Columbia's ground-based launch processing system.

Had the largely successful test been an actual launch, the error might have resulted in a flight abortion and further delay of the already two-year-late shuttle program.

The National Aeronautics and Space Administration (Nasa) did not release word of the programming error and engine malfunction until three days after the scheduled shuttle test. The problem was considered extremely minor and was expected during normal testing procedures, according to Dick Barton, a spokesman for Rockwell International, the company that designed and built the rocket engines.

"It was so obvious that the [engineers] knew exactly what happened when the first booster shut down," Barton observed.

The parameters used in the launch processing system's software are based on the firing times and speeds of the shuttle's 512,000-lb thrust engines and

are supposed to equal the speed of the engine's hydraulic pumps. However, the data used during the test firing was so "narrow" that it did not come close to matching the booster's pump speeds, and the engines never fully ignited, Barton explained.

"It wasn't a failure in the computer," Barton said. "The computer did exactly what it was supposed to do." The engine test was performed "to find out these things," he added, noting that the imperfect parameters have since been corrected.

## Mini-Based Network

Columbia's launch processing system is an elaborate minicomputer-based network designed to check out each mechanical facet of the shuttle prior to lift-off. The system consists of eight autonomous launch processing sites, each of which has an array of up to 40 minicomputers.

Nearly all of the computers in the launch processing network are Modular Computer Systems, Inc. Model II/45 minicomputers. Two Honeywell, Inc. large-scale 6680 host computers provide off-line compilation and coordinate the activities of this minicomputer army, Barton noted.

IBM personnel developed the launch processing system's programming and integrated the software and hardware at each processing site. Each site has about 1.8 million software instructions in its minicomputer operating system

and associated support hardware, an IBM spokesman noted.

The programming error that turned up during last month's engine test was actually caught by the launch processing system's ground launch sequencer, a command checking system that comes into play about nine minutes before the shuttle's lift-off.

If the sequencer had failed to catch the bogus data and prevent the booster

rockets from firing, then one of the five redundant general-purpose IBM Advanced System/4 Pi Model AP-101 computers on-board the orbiter would have flagged the error, Barton said.

The recent space shuttle test was considered to be one of the final steps before Columbia lifts off for its little more than two-day journey into space. The launch is set to take place on April 7.

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## Swiss Scientists Developing Software Engineering Tool

By Jeffrey Beeler  
CW West Coast Bureau

SAN DIEGO — A personal workstation that reportedly boosts a software engineer's effectiveness by as much as 10-fold is currently being developed by a team of Swiss computer scientists led by the inventor of the Pascal programming language.

Currently used as a research tool at the Zurich-based Federal Institute of Technology (ETH), the workstation reportedly enables computing professionals to develop new software independently of remote, time-shared mainframes.

One of the main advantages of such a workstation is that it stores all its intelligence locally rather than forcing users to get their computing power indirectly through on-line CRT terminals.

Another important payoff is that a personal workstation, unlike a typical time-sharing system, is constantly available to its users, even during evenings and weekends, according to Niklaus Wirth, a University of Zurich professor who participated in the unit's development.

Wirth credited the workstation with improving a "competent" software engineer's work effectiveness by an order of magnitude. "I stress the attribute *competent*, for [a software engineer] needs the wisdom to leave his tool and retreat to quiet deliberations when deeper problems of algorithmic design appear," Wirth said here re-

cently at the jointly sponsored fifth International Software Engineering Conference.

## Three-Year-Old Prototypes

Nicknamed "Lilith" by its eight-member team of inventors, the workstation originated three years ago with the development of two prototype machines, both of which are still used at the ETH for software research, text processing, report generation and circuit diagramming. Since then, the two prototypes have given rise to 20 duplicate systems, all of which were produced at Brigham Young University's electrical engineering department in Provo, Utah.

At present, Lilith is still considered only a research tool, and its developers have no immediate plans to make the product commercially available, Wirth said during the conference's keynote address.

Similar in design to the Palo Alto workstation developed at Xerox Corp.'s Palo Alto (Calif.) Research Center, Lilith integrates most of its hardware modules in a single cabinet. The main modules include a 15-in. display screen, keyboard, 16-bit microcomputer, 128K words of main memory and a 10M-byte CCI/Honeywell-Bull cartridge disk unit.

Implemented on this hardware is a high-level programming language known as Modula-2, an extended version of Pascal, which Wirth is credited

(Continued on Page 18)

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## Stresses Program Structure Method Outlined for Easing 'Bug' Detection

By Jeffry Beeler

CW West Coast Bureau

**SAN DIEGO** — Programmers and system developers can reportedly simplify the task of pinpointing software "bugs" if they make the structure of their programs match the structure of the problems those packages were meant to solve.

When a newly developed program and its intended application bear a close structural resemblance to each other, the product's subsequent maintenance problems are often greatly reduced, a consultant said here recently at an international software-engineering conference.

With the right program structure, "A

programmer can tell immediately what parts of a faulty software design have to be changed and — just as important — what parts can be left alone," according to John Cameron, who works for a London-based consulting firm known as Michael Jackson Systems Ltd.

Speaking at a day-long tutorial, Cameron described a software-design methodology that stresses the importance of what might be called problem-determined program structure. The methodology, named Jackson Structured Programming (JSP) after its originator, calls for a program's underlying architecture to mirror the structure of the problem it was designed to ad-

dress.

Cameron described JSP as a "self-documenting" method and credited it with simplifying and minimizing program maintenance, which accounts for a large portion of a typical user's total software budget. He also credited the technique with easing the task of spotting flawed program structure.

### Focus on Arrangement

As its name suggests, JSP is at once akin to and yet quite different from conventional structured programming, a term that "has been so overused in recent years that it has been rendered all but meaningless," Cameron said.

Unlike more familiar forms of struc-

tured programming, which focus primarily on the question of what parts or elements are to be included in a software design, JSP addresses the issue of how those various parts should be arranged to form a completed program and solve a given user problem, Cameron explained.

JSP also differs from conventional structured programming in the mode of thought it demands. Other forms of structured programming force system developers to think dynamically and to constantly concern themselves with program execution and flows of control.

JSP, by contrast, stresses program structure without forcing system developers to think explicitly about program execution, Cameron said.

In essence, JSP consists of four basic design steps. The first two are aimed at developing a correct program structure; the second two, at producing a finished program and checking its structure.

In the third of the four JSP design steps, a programmer lists all the operations to be performed by the planned software and then allocates them within a proposed program structure. "If the allocation of operations is anything but trivial, the program's underlying data structure, which represents a programmer's view of each serial data stream, is probably incorrect and needs to be revised," Cameron said.

## Station to Aid Development Job

(Continued from Page 17)

with innovating.

In designing Lilith, Wirth and his colleagues sought to develop a system that would allow them to maximize code density. As a result, they took the rather unusual approach of designing their hardware to fit their programming language instead of the other way around, Wirth said.

### Code Density

The designers' efforts to optimize their code density apparently succeeded. All of Lilith's software, including its compiler, was originally developed on a Digital Equipment Corp. PDP-11/40 and later transferred to the workstation. After the transfer, the compiler's code was found to be compressed nearly four times more densely on Lilith than on the DEC machine, Wirth said.

In addition to requiring a specially designed programming language, compiler and hardware configuration, the Lilith project prompted the development of a new single-user operating system, text editor, utilities and a machine architecture implemented in microcode.

Lilith requires a signal bandwidth of 11.4MHz to refresh its full 600-line, 800 dot/line display screen. To prevent graphics operations from tying up an inordinate amount of storage space, Wirth and his colleagues reportedly equipped the workstation with a modified memory that provides a 64-bit access path for "reads" and a 16-bit path for "writes."

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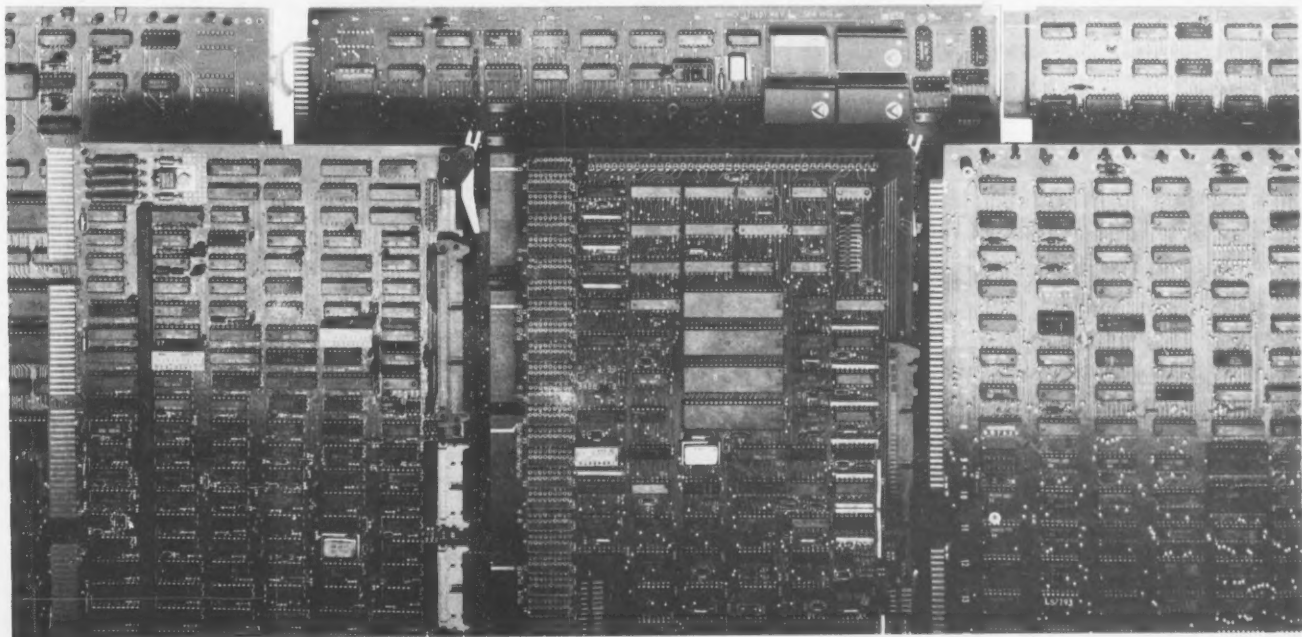
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# IBMer Describes How Managers Communicate

By Rita Shoor

CW Staff

ATLANTA — Three-quarters of a person's life is spent in some form of communication — but far from training him for it, formal education usually inhibits the communication process, IBM program administrator Richard Gottlieb claimed here recently.

Communication takes place via speaking, listening, writing, memory and reading, the specialist in professional development for IBM's Data Processing Division continued. However, at least 55% of communication is nonverbal,

he told attendees at a recent conference sponsored by Management Science America, Inc. (MSA).

Nonverbal interaction is based upon one's ability to describe what one sees and one's subsequent feelings about it, he continued. Therefore, "if you like someone, you tend to describe him positively ... if you don't like him [you describe him] negatively."

Feelings and emotions may not be the best way to handle communication in the business world, Gottlieb noted. But it is possible to separate how you feel from what you see?

Yes, Gottlieb maintained.

He defended his position by having the audience describe him with a form listing adjectives tied to four different characteristics — the tendency to control, emote, ask questions and tell others what should be done (see Figure 1).

These four characteristics were then placed in a simple diagram (see Figure 2) and Gottlieb maintained that everyone — including himself — could be described through one of the four diagram quadrants. Thus, a person would tend to be a "driver" (control/tell), an "expressive" (emote/tell), an "amiable" (emote/ask) or an "analytical" (control/ask).

People who are diagonals on the diagram are usually uncomfortable with each other, the administrator explained. However, he suggested methods for working successfully with all four personality types.

Driver types are very action-oriented and require facts to make any decision, according to Gottlieb. "Never tell a driver what to do," he cautioned the conference attendees. If you try it, the driver will usually "do the exact opposite." Whether the driver you're working with is a superior, subordinate or peer, always offer him a choice of alternatives backed up by facts.

"Expressives live below the [ask/tell] line" and do not use facts to make decisions, Gottlieb said. There isn't much point in giving a detailed report to an expressive, since he probably won't read it.

Expressives tend to do things because "they feel good." The expressive will perform a task assigned to someone else "because it's more fun." While this tendency can create havoc on a team project, Gottlieb maintained that it is essential to give people what they need

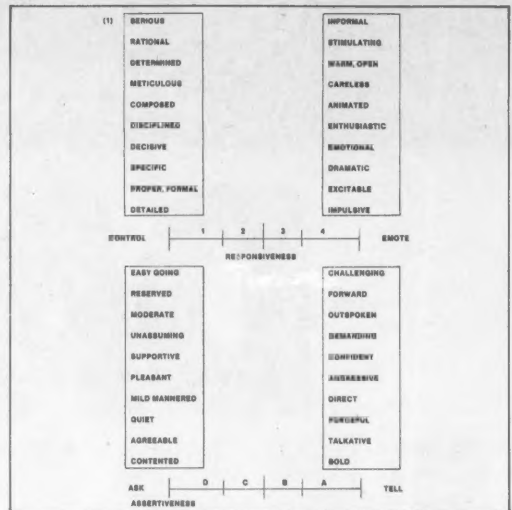


Figure 1

and play to their strengths in order to motivate them. Therefore, provide the expressive personality with "fun and excitement" and forget about justifying a decision with facts, he said.

The amiable personality "moves slowly with feeling," Gottlieb continued. This is the sort of person who can push a driver-type over the edge because of the way he does things. The amiable manager can be very effective, but will always get things done by dealing with people on a personal basis, the speaker said. The best way to get things done through an amiable is to ask for his help in dealing with a situation, he said.

The fourth quadrant is inhabited by the analytical. This person is accurate and precise and "wants a written guarantee" of everything. In order to successfully deal with the analytical personality, you must put every proposal in writing and it must be perfect. "Everything must add up and all

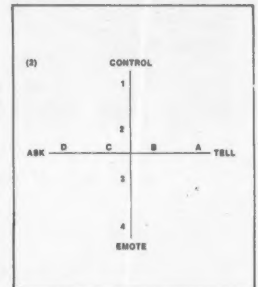


Figure 2

the words must be spelled correctly or you'll lose" when the person you work with falls into this category, Gottlieb said.

Although it is possible to change one's own quadrant, with a lot of work, "you really can't change others," he noted.

As a final note, Gottlieb's audience almost unanimously decided that he fell into the expressive category — a description with which he definitely agreed.

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# Consultant Gives Hiring Tips

## Human Resources Called 'Real Crisis' of DP

By Rita Shoor

CW Staff

ATLANTA — "The real crisis — and future — of DP is in the human resources area," according to M. Evan Lindsay, a manager with Peat, Marwick, Mitchell and Co. here.

The executive search division of Peat, Marwick handles recruiting for all professional areas. "The most difficult [area] of all is DP," Lindsay told attendees at a recent user group conference sponsored by Management Science America, Inc. (MSA).

Computer-oriented technicians are in such demand that "everything has to be right for the talented DP person" to make a move, the consultant stated.

One problem in attracting and keeping the right people is the decline in glamour in the computer field, he said. "A lot of people are no longer satisfied to be DP specialists." They want to influence overall business decisions, Lindsay noted. So, many competent people leave DP after using it as a training ground.

Another factor leading to a technical personnel crisis in certain geographical areas is "a big industrial move to the Sunbelt," he said. Specifying Jackson, Miss., and Tampa, Fla. as examples of "growth cities," he said that employers in these areas are "crying for DP talent."

### Tips for Managers

The recruiting specialist had several recommendations for the hardpressed manager who is trying to bolster his technical staff. First, he should analyze why he is hiring the person, he stressed. After all, "it's best not to hire people... they're expensive and they cause problems."

Constant project overloads, the acquisition of new hardware and/or software, a decrease in the productivity of

the current staff or a pent-up staff demand caused by previous hiring freezes are good reasons for hiring



M. Evan Lindsay

additional people, Lindsay said.

There are also "bad reasons" for hiring, he continued. These include poor organization with "the right people doing the wrong things," inadequate in-house training and development and poor planning by management that results in missed deadlines and management-by-crisis situations.

"Be awfully sure that you're managing your function to the best of your ability" before hiring anyone, he stressed.

Once the decision is made that a staff increase is in order, Lindsay suggested that the manager define the organization's goals and objectives and write down an organizational plan for obtaining the people required to fulfill these goals.

The next step is to write job descriptions that translate the organizational goals into specific jobs that will accomplish them, he continued. There is "no other way to really define and organize people's work."

The manager is then ready to write a

hiring specification — "a picture of the person you want to attract," he explained. This should be written in terms of specific experience rather than being tied to number of years of experience, Lindsay cautioned. The potential employer must avoid being dogmatic in generating this document in order not to miss people who don't quite fit the specification but who might be capable of handling the job, he pointed out. "Flexibility is essential."

The recruiting process itself should

be an everyday part of the successful manager's business life, Lindsay noted. "Every time you meet someone who impresses you, write down his name, what he's doing and your impression of him," the consultant said, and "ask your subordinates to do the same."

Maintaining this file on people is part of being a good manager, he said. He also recommended attending professional conferences and seminars in order to build up potential employee contacts.

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## Making the Interview Work

ATLANTA — The job interview is an integral part of the employee recruitment process, M. Evan Lindsay told the audience here at a conference sponsored by Management Science America, Inc. (MSA).

The potential employer should remember that technical specialists "move in a very tight circle" and that each interview can help with future recruiting, he said. The consultant from Peat, Marwick, Mitchell and Co. offered seven recommendations for successful interviews:

- Make friends during the interview process, and treat people with dignity. Keep in mind that the person you're interviewing now may be in a position to hire you at some future time.
- Sell yourself, your company and the opportunity with some enthusiasm. Failure to approach the interview with this attitude can result in "the deal falling through."
- Interview people at least twice if you are really interested in them. It might be a good idea to conduct the second interview in a nonoffice environment — perhaps a coffee shop or restaurant.
- Check references thoroughly and try to work around the references pro-

vided directly by the candidate. Rather than simply talking to the potential employee's previous supervisor, it might be worthwhile to ask that person to refer you to other people in the company who could provide additional background.

- Extend the job offer both verbally and in writing and make the offer contingent upon no "extraordinary problems" being discovered during the reference check.

- Set a reasonable time limit — usually about a week — for the candidate to respond to the job offer.

- Have someone from your organization call the candidate several days after the offer has been extended to congratulate him on having received a firm job offer.

The consultant offered one final pointer. While successive multiple interviews with different people within an organization are acceptable, he said, he turned "thumbs down" on a situation where several people are interviewing the candidate at the same time. Although one audience member pointed out that MSA had used this technique successfully, Lindsay warned that a "three-on-one" interview usually has a negative effect on the candidate.



# Priced Lower Than Other CS Systems

## DG Model CS/10 Features Cobol Compatibility

By Hillel Segal  
Special to CW

Data General Corp.'s smallest commercial computer system, the CS/10, is especially notable because it offers at a lower price the same language compatibility that is available throughout the DG line of business minicomputers.

Like other CS systems, the CS/10 is programmed in Cobol, the standard language used on all business computers made by DG. The compatibility of software throughout a large family of computers is one of the line's most significant advantages.

While the CS/10 did well when running the business-oriented type of application for which it was designed, the semicompiled Cobol is definitely not the greatest for scientific number-crunching. Benchmark testing conducted for the Association of Computer Users (ACU) revealed a system strong in file-handling and storage tasks but weaker in the type of math functions that scientific applications generally require.

The tests were conducted for ACU by the Business Research Division of the University of Colorado, with standard programs used to compare the time it takes to perform similar tasks on different computers. The results are one useful way of comparing the relative performance of computers by different manufacturers.

In this case, the programs were translated into Cobol for the CS/10. Most systems before this one have been tested in Basic, but since that language is not offered on the DG system, a conversion was necessary. DG personnel performed the translation, and their work was checked for accuracy by our consultants before tests were run.

It should be apparent from the results of the scientific/engineering problem that Cobol is not the ideal language for that application. The CS/10's time of 58 minutes, 21 seconds is quite a bit slower than comparable systems using Basic were able to achieve. But then, how many scientists use Cobol anyway? Most of them program in Fortran, I suspect.

In the accounts receivable problem, the CS/10 equipped with hard-surface disk drive gave a strong performance, finishing in 2 minutes, 40.3 seconds. The addition of the hard disk pushed the total system price (as tested) above our \$15,000 upper limit for the Series 1 Benchmark Reports, but it should be noted that a printer less expensive than the Dasher LP2 could have been chosen without affecting any of the results reported here.

### Cobol Features

Cobol compatibility for the CS line of computers is provided through the semicompiled design. The compiler produces a pseudo-code which is standard across the entire line. Each processor then uses its own run-time system to interpret and execute the pseudo-code.

Included with the compiler are useful utility programs and features. A special screen utility is provided for the automatic generation of screen faces for user reference. These screens can then be recalled from within the Cobol

## SCOREBOX

System: DG CS/10 Model C1  
Current Price: \$15,500

### Series 1 Results\*\*\*

Systems up to \$15,000

	C-1 (Scientific/ Engineering)	C-3 Accounts Receivable
	Time	Time
Pertec PCC 2000	28:48.4	6:04.3
North Star Horizon	12:01.9	1:57.7
Cromemco System Two	14:52.6	2:48.0
Texas Instruments 771	22:05.4	3:38.1
Vector Graphic System B	19:30.0	5:56.5
Decstation 78	7:55.7	4:21.5
Radio Shack TRS-80 Model II	20:00.7	3:38.6
Apple II	21:11.0	6:17.4
Digital Microsystems DSC-2	13:24.9	3:28.8
Ohio Scientific C3-A	12:10.7	15:49.3
Alpha Micro AM-1011	5:18.3	3:25.3
DG CS/10 Model C1	58:21.0	*****

### Series 2 Results\*\*\*

Systems \$15,000 to \$25,000

	C-1	C-3
IBM 5110	29:47.2	4:11.0
Wang 2200VP	2:05.8	3:20.0
Texas Instruments FS990/10	*	3:18.6
Hewlett-Packard System 45	4:38.9	5:05.8
DEC PDP-11V03	14:43.4	4:14.0
Q1 Lite	6:50.7***	5:03.3****
Univac BC/7-610	12:09.2****	10:37.0****
Northern Telecom 405	*	**
Datapoint 1170	38:27.5	6:50.4
Randal 100	13:52.4	10:05.0
Hewlett-Packard 250	4:05.9	4:45.7
Texas Instruments DS990/2	*	2:48.3

\*Test could not be run because of memory limitations.

\*\*Test could not be run because of formatting limitations.

\*\*\*Both Series 1 and Series 2 were run on the same programs.

\*\*\*\*Results include both compile and run-time.

\*\*\*\*\*Time of 2:40.3 was obtained using a hard-surface disk, which raised the system price to \$17,400.

This is the twenty-sixth in a series of articles giving the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member non-profit organization.

program with a single reference.

Another feature is the ability to have programs interrogate the special function keys on the keyboard. This can be used for operator command during program execution.

The CS/10 system itself included a Micronova processor, 64K bytes of central memory, a 1.2m-byte floppy disk drive, CRT with detached keyboard and a Dasher LP2 printer. Total price of the CS/10 Model C1 in floppy disk configuration was \$15,500. The actual system tested, including a 12.5m-byte hard disk, cost \$17,400. Less expensive printers are also available for those desiring a less costly configuration.

Expansion capabilities for the CS/10

include up to 50m bytes of hard disk storage and up to 128K bytes of memory. A maximum of four users can be connected at once to the system.

Software for the CS computers is supplied for the most part by OEMs who market the equipment to end users. DG itself does not supply any application packages.

To facilitate the development of programs by the software houses, the CS/10 comes with a number of sophisticated utilities. These assist with file management, system management and program debugging. There are also special programs to describe screen layouts and write the corresponding Cobol code for the screen faces, to describe a hierarchy of menus and direct

program flow based on user response and to create a data base or produce reports from data. These aids help the OEMs (called commercial systems suppliers in the DG parlance) create applications with a minimum of effort.

Three program editors are offered: a line-oriented interactive Cobol editor, a general-purpose screen editor and a string-oriented editor.

While these applications development products could be used by customers to write their own programs, the marketing approach taken by DG does not encourage this.

Instead, the emphasis is placed on creating and maintaining a strong group of OEMs to identify customer applications, create the software and documentation and install the equipment.

The DG documentation is oriented to meeting the OEMs' requirements, not putting the tools in end users' hands. Those who decided to program themselves would still need to depend on the OEM for information and assistance.

### User Reactions

When our consultants surveyed DG customers, they found widespread satisfaction with hardware reliability and service, but less strong support of the OEM efforts to furnish programming and train users of the systems.

Since the CS/10 is a new product, the interviews were conducted with customers who had the functionally similar CS/30 systems. The firms contacted included manufacturers and wholesalers, hospitals and clinics, CPAs and several other businesses. Most of the applications mentioned were in the accounting area: payables, receivables, payroll, general ledger and such. Some invoicing and data base management were also noted.

Reactions to OEM support varied, with one user commenting that "our OEM has been very helpful and cooperative," while another said "some modifications were necessary. It didn't go smoothly with the dealer who doesn't understand our business needs." However, in general the users said their system was easy to operate, reliable, and had been relatively painless to implement.

### About the Author

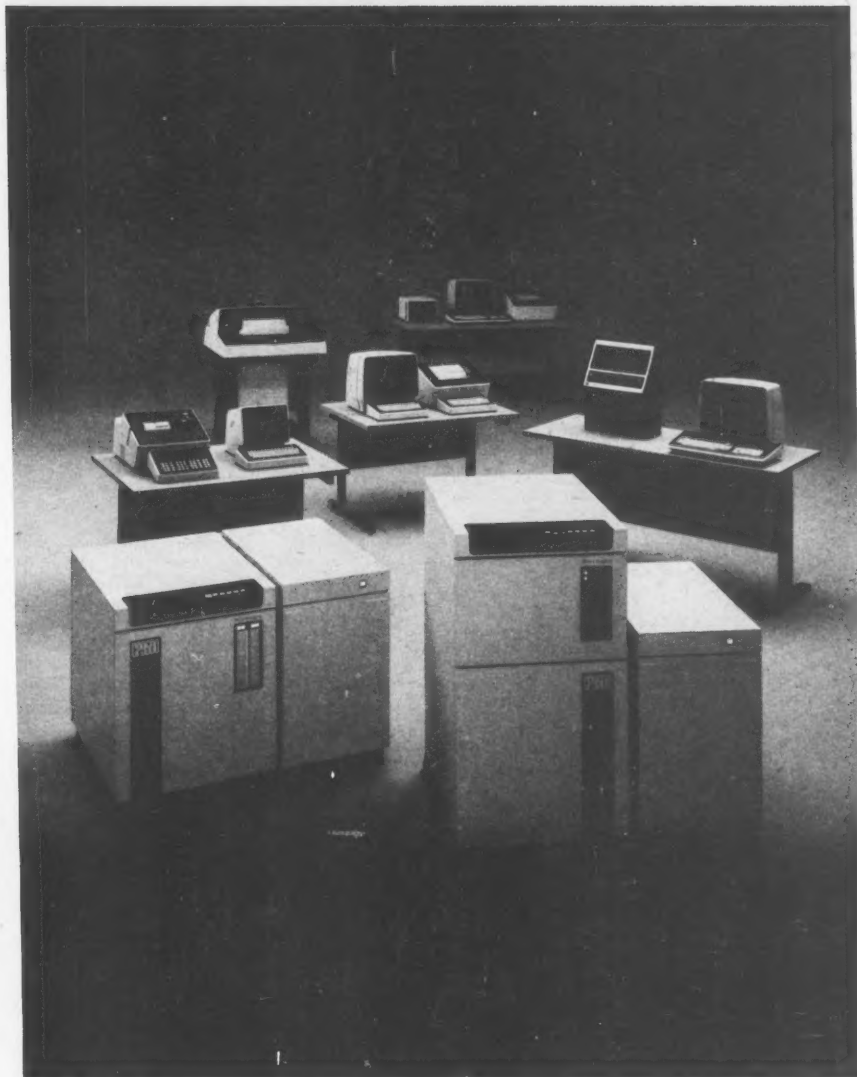
Hillel Segal is president of the Association of Computer Users (ACU), a nonprofit association with members all over the U.S., Canada and many other foreign countries.

One of the association's key activities is the publication of its "Benchmark Reports." Each month a new 24-page report is produced covering another computer system.

In addition, ACU publishes seven bi-monthly newsletters for users of small computers, midi computers, large computers, time-sharing systems, distributed processing systems, word processing systems and home and hobbyist computers.

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# Burroughs

# Insurer Sets Cobol Conversion at \$20 Million

(Continued from Page 1) tized off the insurance firm's budget list year after year until IBM "pulled the plug" by informing its customers it was withdrawing support on Cobol-68.

The problem with such a conversion is that it pulls people away from development projects that improve productivity within the large organization, he explained.

The Travelers' computer

center averages some 1,500 jobs each day and processes an estimated two million transactions through its network during the same time span, Brophy said. Six hundred thousand reports are generated each year and that number is going up by 15% to 16% each year, he continued.

All programming is handled in the Hartford center by an estimated 1,000 technical analysts and programmers who

base the computer system designs upon specifications from business analysts in the company's user departments, he said. There are an additional 250 research and development specialists in the firm's Computer Science area, he noted.

Work proceeds on a configuration that includes seven IBM 3033s with another scheduled for spring delivery with a network encompassing more

than 800 minis and approximately 7,000 terminals in various field offices.

The growth rate of the information center is illustrated by a projection for implementing some 540 data bases by the end of 1984. By the end of 1980, 403 of the data bases were already up and 522 are expected to be installed by year-end 1981, according to Brophy. The company hires about 400 professionals each

year to handle this growth, he said.

## Consumer Pays

X3J4 is asking Travelers to stop this type of development and undertake a conversion that raises costs that will, in turn, be passed on to the consumer, he said. Besides upping the insurance price tag, he pointed out that the firm's productivity would be negatively affected if an overall Cobol conversion became necessary.

He also opposed an observation by Don Nelson, chairman of the Codasyl Cobol committee, that "the narrow and short-term view of American business" is responsible for the decline in U.S. productivity [CW, Feb. 16].

"[It] [the proposed Ansi standard] is an example of unnecessary regulation that forces business to take a short term point of view" when regulatory bodies set up the rules for industry, Brophy said.

American business actually has a high level of productivity, according to the executive.

The problem is that productivity in the U.S. — especially for white-collar workers — is no longer growing. In contrast, Japan, among other countries, has a low productivity level that is increasing at a relatively fast clip.

The answer for American business is definitely not more regulation, Brophy asserted. Assuring compliance with regulations and tying the white-collar worker up with number crunching and quantitative analysis is actually a major factor in keeping productivity growth rates down, he said.

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# Insurance Exec Endorses Suit Brophy 'Means Business' in Protesting Cobol-80

By Rita Shoor  
CW Staff

HARTFORD, Conn. — "We're not against change or better Cobol [but] we mean business," Joseph Brophy, senior vice-president at Travelers Insurance Companies, said here recently.

Brophy explained that the threatened class-action suit against the American National Standards Institute's (Ansi) X3J4 members — should they support the proposed Cobol standard [CW, Jan. 26] — is one way to ensure that Ansi views the end user's objections seriously.

Today's society is a litigious one and it is "becoming more acceptable to handle things this way [through litigation]," Brophy continued. If some organization such as Ansi impacts the way another organization does business, "there has to be a legal way to bring about a remedial situation."

However, the executive stressed that he "wants to pursue every possible means of getting [X3J4] on the right track without litigation." The right track is upward compatibility between Cobol-74 and the new standard, according to Brophy.

At about the same time *Computerworld* learned of the threatened suit from a notice in the January 1981 issue of *Computer Law and Tax Report*, Brophy asked to meet personally with Ansi attorneys.

"There have been some conversations between Travelers attorneys and Ansi attorneys" prior to that request, Brophy said. However, these dialogues essentially consisted of Ansi trying to describe its appeals procedure and Travelers representatives trying to understand that same procedure.

## Meet Planned

In an effort to personally "get my arms around things," Brophy will be meeting with some Ansi representatives in New York this month. Possible litigation is not his only strategy for dealing with the situation. One option is for businessmen to get more involved with the X3J4 committee that sets the Cobol standards, he said.

Another alternative is to make certain that state senators and insurance commissioners are apprised of the situation. Brophy's "basic feeling on Cobol-80 is that it's inflationary." The current mood of the country, the government and American business is such that they will not tolerate such a proposal, he said.

While he felt a lot of thought had evidently gone into the proposed standard, he does not think that X3J4's changes reflect what large users really want. Ansi may be viewed as a "self-perpetuating organization," he said. From time to time, such an organization must stop and review whether its charter is correct or whether the criteria surrounding that charter have, in fact, changed.

For example, Travelers itself has implemented DP systems that were quickly abandoned because they did not meet current needs and objectives. "When you have made a bad investment, you have to bite the bullet and minimize the loss," he observed.

Therefore, the argument by some technicians that it is too late in the standards development cycle "to create

such an uproar" about upward compatibility [CW, Feb. 16] does not mean much to Brophy. Whatever has been spent so far on the proposed standard "is minuscule compared to the possible cost" of implementing it as it currently exists, he claimed.

Brophy sees nothing wrong with the committee taking the necessary time to develop a standard with upward compatibility, even if the end result is Cobol-83 rather than Cobol-81. "I'm not against Ansi," he said. But based upon communications from large end-users throughout the country, a non-upward compatible version of Cobol "isn't at the top of anyone's priority list."



CW Photo by R. Shoor

Joseph Brophy

While the proposed standard offers some definite technical improvements over Cobol-74, his position is that

most companies are forced to deal with limited resources. Given these limited resources, most technicians would probably say "I can get the job done with what we've got" rather than targeting their efforts to a Cobol conversion.

Travelers and other large Cobol users have invested millions of dollars in Cobol application code in anticipation of a favorable return on that investment. Stopping to convert these programs now without allowing the company to achieve the benefits of its initial investment is like forcing the owner of a \$5,000 car that works well to trade it in for a \$10,000 car, according to Brophy.

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**Datacomm Briefs****Bell to Ask Increase  
In Rate of Return**

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — A Federal Communications Commission (FCC) hearing on AT&T's request for a hefty increase in its rate of return is scheduled for April 6, according to an order released last week. The order also said an "expedited decision would be in the public interest" — meaning the commission will consider final action immediately afterward.

The phone company wants the present 10.5% rate of return raised to 13% — a change that would lead to substantial increases in all of its charges; Bell was rebuffed last month when an FCC administrative law judge recommended 10.87%.

Since then, the commission's trial staff — which, basically, provides a second opinion in such matters — has recommended an 11.5% rate of return. Largely, this is because AT&T's embedded cost of debt allegedly will be higher than the figure used by the administrative law judge.

The phone company received additional support from the U.S. Independent Telephone Association, which said that "in determining the rate of return for AT&T, the commission is also determining the rate of return... for each of the approximately 1,500 independent [telephone companies]."

However, the Maryland People's Counsel insisted that the law judge's recommended 10.87% rate of return is "excessive and unreasonable" because it failed to consider the reduced costs of a capital structure containing more debt and less equity. "The commission cannot abdicate its responsibility of adopting... that capital structure which minimizes the cost of capital," the group pointed out.

**Eyeing Telpak Demise,  
Boeing Goes With SBS**

VIENNA, Va. — Telpak's impending end was a major reason Boeing Computer Services (BCS) signed up with Satellite Business Systems (SBS), Dr. M.U. Ayres, director of network services, said here recently. Another reason: the greater flexibility and availability of broad bandwidth satellite channels compared with terrestrial facilities. Dr. Ayres said that as a result, he expects use of SBS facilities will reduce his company's communication

costs "up to 50%."

He spoke at a ribbon-cutting ceremony which marked the beginning of commercial service by SBS, a partnership of IBM, Comsat General Corp. and Aetna Life & Casualty Co. BCS is the first SBS customer to go on the air. Nineteen others have ordered service.

Initially, BCS will transmit data and voice between its data center here in Vienna, a Washington, D.C., suburb, and two other centers in the Seattle area. The BCS DP center in Wichita, Kan., will be added this fall, and by the end of 1983, a total of six to eight sites will be attached to the new network.

The company has leased four high-speed data channels and four voice channels from SBS. The former, transmitting at 56K bit/sec, interface with 300- to 9,600 bit/sec terminals through Comten communications processors. Each of the voice channels carries digitized telephone calls at 32K bit/sec. Aside from data and voice, the company plans to use its new facilities for electronic mail and teleconferencing.

**AT&T Asks to Build  
Teleconferencing Net**

WASHINGTON, D.C. — AT&T last week requested Federal Communications Commission (FCC) permission to build and operate a nationwide video teleconferencing network. The proposed Picturephone Meeting Service network would begin next December between New York City and Washington and would be extended next year to nine other cities — including San Francisco, Dallas and Atlanta. Thirty more cities would be added in 1983.

Public teleconference rooms are to be provided in each of these cities; the facilities would be leased to users in 30-minute time increments. The service would interconnect similar facilities built by customers on their own premises.

Cost of the private service was estimated at \$11,950/month for equipment, plus a nonrecurring installation fee of \$117,600. Usage fees, depending on distance, would range from \$240 to \$840 for the first 30 minutes, and \$200 to \$800 for each additional half hour. Charges for the public service would be \$165/half-hour for use of the teleconference room, plus the applicable transmission fee.

The service would provide two-way simultaneous transmission of audio, color video and graphics via satellite channels terminating at five earth stations.

Each room would be equipped with a picture processor which can convert the outgoing analog audio/video signal into a compressed digital format and also convert incoming signals back to analog. This equipment also has encrypting/decrypting capability, the company said.

There would be seven color TV cameras in each public teleconference room, three monitors, a camera-equipped graphics display unit able to transmit images of three-dimensional objects recorded on transparent or opaque media, equipment which could produce hard copies of incoming graphics displays and video tape recorders, AT&T added.

**Corrections**

On-Line Systems, Inc., which produces Foregraph and Tel-A-Graf [CW, Feb. 23], is located at 115 Evergreen Heights Drive, Pittsburgh, Pa. 15229.

The chart derived from Frost & Sullivan's "Energy Efficient Data Communications Networks" report [CW, Feb. 16], which contrasts energy consumption levels of various CRT terminals, said IBM's 3101/10 and 3101/20 terminals both consume 144W. An IBM spokeswoman, however, maintained the terminals really consume just 50W each.

# Former FCCer Expects Regulation of DP Industry Despite Reagan's Stance

By Bill Laberis  
CW Staff

BOSTON — The federal government and the Federal Communications Commission (FCC) will ultimately spread their regulatory tentacles around part of the computer industry as telecommunications and data processing meld into the same super-hybrid technology of the near future, according to Thomas J. Houser.

Speaking at Emerson College here, the self-proclaimed born-again Republican and general counsel to the National Association of Manufacturers said lasting regulation of data communications is inevitable, despite the Reagan administration's fervent free-market bent.

But there has never been a presidential administration, including the present one, that has come into the White House with a truly sound sense for telecommunications, he said. He added that recent administrations have known virtually nothing of the growing importance of the fusion between telecommunications and DP into data communications.

As Houser delivered this rather bleak analysis, he was quick to credit the FCC for its "courageous if not brilliant activity, apart from congressional assistance," in the regulatory sphere. Among the many positions he has held, Houser once served as one of the FCC's seven members.

## Host of Questions

Houser, a former collegiate football whiz whose resume reads like a Washingtonian stairway to the stars, said a high degree of federal regulation of data communications will be essential to protect constitutionally guaranteed rights of privacy, among other things.

"The growth in data communications is generating some highly technical and confusing questions, legal and otherwise," he explained. "For one thing, it is becoming increasingly difficult to tell physically and intellectually where computing begins and telecommunications ends."

"Just look at the phenomenal growth in EFTs [electronic funds transfers] and the proliferation of at-home banking," he said.

"Who is going to have the right to examine one's personal finances? This is just one lingering question that will require regulation."

Houser also projected a continued need for government-enforced industry standards, protection of business privacy and patent rights and "promotion of an orderly transmission of communications signals."

All of which means continuous growth in communications regulation. But, as technology has changed and the U.S. economy has evolved into more of an information and service machine and less the industrial behemoth of days past, so has Houser seen the nature of government regulation change over time.

## Accent Off Price Control

The regulatory accent is no longer on price control, as evidenced by deregulation throughout the petroleum industry.

"Ideally, regulation — or deregulation as in the case of the FCC and the telecommunications industry — should increase competition to the advantage of consumers," Houser said.

"But the government clearly does not understand the nature of competition. After all, it functions as a better than half-trillion-dollar monopoly. Hopefully, data communications regulation will be left to the FCC," according to Houser.

Houser cited the case of Pacific Telephone and Telegraph as an example of "the government's view of competition as setting companies loose, then regulating some while subsidizing others."

Pacific is the largest of AT&T's 23 operating entities and probably Ma Bell's biggest problem child. Debt-ridden and not particularly credit-worthy, the company is forced by regulation to charge the lowest rates in the nation for basic phone service, and skyrocketing demand for this service has chewed up most available investment capital, leaving little for other markets, such as the private business exchange (PBX) market; the company has claimed.

Increasing government deregulation of telecommunications has encouraged California PBX users to seek alternatives to Pacific.

The result is that the company is losing its share of the PBX market it once dominated.

"But it's tough when you start out with one hand tied behind your back," Houser said. "Communications regulation should put everyone at the starting gate together."

## AT&T Suit

As for the ongoing antitrust suit against AT&T, Houser warned that "what we are tinkering with is the greatest phone company in the world."

The trial, begun earlier this month, would end in about four and one-half years if it ran its complete course, with "only the lawyers coming up winners," he said.

Instead, Houser predicted increasing pressure, perhaps from the White House, for an out-of-court settlement and a consent decree.

Asked if the thought the ultimate result would be AT&T's spinning off Pacific and Western Electric Co., he replied, "I think there is at least a 50-50 chance of that happening."

"But with the growing fusion of telecommunications and data processing, it is totally unreasonable to expect that AT&T can stay out of data processing altogether, or that IBM, for that matter, could or should stay out of telecommunications," he said.

"IBM's SBS [Satellite Business Systems] satellite was a great idea," Houser commented.

"There has been an over-regulation of AT&T by the FCC," he said. "Everyone knows there is a big clash brewing between IBM and AT&T. I don't think any regulation or court action is going to stop it."

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# AT&T Tariff Filed Last Fall

## AT&T, Users Locking Horns Over Wats Rates

By Phil Hirsch

CW Washington Bureau  
WASHINGTON, D.C. — A spirited battle was under way at the Federal Communications Commission (FCC) last week between AT&T and business telecommunications users — including many that provide computer-based on-line services — over Wats rates. The basic issue is whether discounted rates should be offered during certain hours of the business day or during nonbusiness hours.

The dispute grows out of a tariff AT&T filed last fall [CW, Sept. 22], which eliminated the Measured Time (MT) and Full Business Day discounts long offered to users who made heavy

use of Wats service.

Three months later, in December, the FCC suspended this tariff and told the phone company it would have to offer discounts for off-peak service during the evening and weekend hours. Other interested parties were also invited to submit off-peak discount pricing plans.

AT&T's off-peak pricing proposal was submitted to the FCC last February. Basically, it offers discounts of 35% to 65% off the highest daytime rates for Outward Wats calls made between 5 p.m. and 8 a.m. on weekdays and at any time on weekends. For similar 800 (In-Wats) service, the discount would be 28% to 52%.

Since February, several users have attacked AT&T's proposal. A common theme is the difficulty of changing their business hours to take advantage of the reduced rates. In many cases, they say, such a shift is impossible because Wats is used to communicate with their customers rather than with their own personnel.

Instead of discounts for calls made during nonbusiness hours, the users want the commission to approve lower rates for certain less busy periods during the business day. They have also suggested phasing in the new tariff — which involves hefty increases for heavy Wats users — on a step-by-step basis over an extended period of time.

But AT&T adamantly opposes both of these suggestions. The first would result in a substantial loss of revenue, the company told the commission earlier this month, adding that it would have to raise proposed daytime rates to recoup this loss.

Bell opposes gradual phasing in of the new tariff because another FCC decision, issued last year, requires resale and sharing of Wats — by competing specialized carriers, among others.

The phase-in schemes which have been proposed to the FCC "would generally leave rates at the high end of the use schedule at a level which, if subject to resale, would likely cause severe economic harm to AT&T for an extended period of time," the company said.

As things stand now, the Wats tariff AT&T filed last September, together with the off-peak discounts the phone company proposed in February, is scheduled to become effective next June 1. The commission has said, however, that if it doesn't like any of the discount schemes that are proposed, it will come up with one of its own.

## Irving Levine To Keynote Meet

WASHINGTON, D.C. — The ninth annual international conference of the EDP Auditors Association (Edpaa), slated for June 21-24 at the Washington Hilton Hotel, will present Irving R. Levine, economic affairs correspondent for NBC News, as its keynote speaker and Dr. Carl Hammer, director of computer sciences at Sperry Univac, as its conference session speaker.

More than 40 exhibitors are expected at the conference, which has 34 different sessions under such headings as DP audit basics, legal update, advanced DP audit tools and techniques and systems development life cycle.

Registration costs \$350 for Edpaa members and \$400 for nonmembers. More information is available from Claire Kelly, Edpaa, National Capital Area Chapter, P.O. Box 50246, Washington, D.C. 20004.

## DecisionSupport To Be Addressed

ATLANTA — A conference called Decision Support Systems (DSS-81), organized on a nonprofit basis by The Institute of Management Science (Tims), will be held on June 8-10 here and will discuss the computer-based software tools that support managers' planning and decision making.

The conference is in four sections: G.R. Wagner of Execucom Systems Corp., the conference chairman, will lead a session for executives. Other sections were designed for builders, management information systems experts, and researchers.

The conference costs \$395 and profits will be turned over to Tims for future research in the field, the organizers said. More information is available from Julie Eldridge, Tims headquarters, 146 Westminster St., Providence, R.I. 02903.



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### FREDERIC LAMOND

Frederic Lamond worked at The Economist Intelligence Unit before joining Univac as a Senior Systems Analyst. You have read a number of his articles in *Datamation* and *Computer Weekly*. This seminar is the result of a just-completed investigation of the IBM 4300 Series. Mr. Lamond is a seasoned speaker who entertains as well as informs seminar attendees.

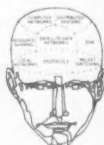
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# McAuto, With \$133 Million in Hardware,

By Tom Henkel  
CW Staff

ST. LOUIS — Industry analysts have long been saying the computing services/time-sharing business was making a big comeback. If the comeback hasn't already begun, it's about to.

McDonnell Douglas Automation Co. (McAuto) one of the top computer services vendors in the country, just opened a new computer center — a \$70 million, seven-building complex that houses \$133 million worth of hardware and some 2,500 employees to serve some 1,600 terminals used by commercial clients.

McAuto proudly claims the new center is the world's largest — in terms of computing power lodged under one roof. But the roof in this case — to use a technical term — is big.

The computer center is 450 feet long, 150 feet wide and three stories high. In it are seven IBM 3033s, one 3031, four Control Data Corp. Cyber series processors (two 750s, a 730 and a 175), some assorted minicomputers and two full floors of peripherals and communications equipment.

McAuto also boasts the new center is one of the few large computer facilities designed specifically for computers. Many other large centers, McAuto Executive Vice-President-Commercial Robert L. Harmon said, are retrofitted office buildings, which are difficult to adapt to changes in the computer industry.

## Designed to Adapt

The McAuto facility is certainly different. Once one gets past the idea that it's larger than a football field, there are some more subtle differences. For example, the north wall of the computer center is a giant crawlspace, housing all the power, plumbing, cooling and air ducts and fire protection equipment.

This construction, Harmon said, will allow McAuto to more easily adapt to changes. For example, if a future system would require a new kind of cooling, or a different kind of power, McAuto can — at least theoretically — cope with it.

The center requires 15 times more air conditioning than an office complex of equal size. Consequently the building is equipped with a 150,000 gallon tank of chilled water to cool the building. Heating the building won't be a problem, though. McAuto estimates the heat given off by the processors will heat all the offices in the winter.

The center will require an estimated 175 kilowatt hours of electricity in a normal year. That's enough power to supply 5,000 homes for the same period. But homes can use the power as supplied — in this case — by Union Electric Co. McAuto cannot. To run the processors, the power has to be cleaned up and stabilized, the firm said.

And supplying normal power is only half the battle. McAuto must be able to serve its commercial customers even if the outside power is cut off. Just as the three main floors are filled with 450-ft worth of hardware, the basement is filled with batteries — 3,480 Exide batteries — that provide a 15-minute reprieve in the event of a drop out. For power failures longer than 15 minutes,



Monitoring on-line computer operations, personnel man the control center at the new McAuto computer facility on a 24-hour basis. Using CRT terminals, the monitors can determine the status of jobs in process and can talk with clients about the progress of their programs, should a problem arise.

McAuto has four Cummins generators that can provide 25% of full power.

When the outside power fails, and the battery backup is activated, blue flashing lights located at about every 50 ft in the computer and peripheral rooms begin flashing. That signal means operators have 15 minutes to shut down to 25% of capacity.

Those functions — the battery backup, diesel generators, flashing blue lights and so on — are controlled by — you guessed it — a computer, an IBM Series/1 with a McAuto-designed software package. To test that package, McAuto has designed its own problem simulator; while that package is still in the testing phase, McAuto plans to use the Series/1 to monitor power usage, the firm said.

## System Setup

The main IBM processors each have 12M- to 16M bytes of main memory and run under IBM's MVS/SP Release 1 with a JES 3 scheduler on one machine in each cluster. Software in use includes: IMS, TSO, CICS, APT, MRCs, Panvalet, ANS Cobol, Fortran H, PL/I and Assembler H. A stand-alone 3033 is used to process on-line

applications, and the 3031 is dedicated to a single client, the firm said.

The IBM clusters are supported by a pool of 90 IBM 3400 series tape drives and 530, 3330 and 3350 disk drives.

The CDC configuration consists of two Cyber 750s with 262K 60-bit words of memory each, and the two processors share an additional 1M byte of extended main memory. The Cyber 175 and the Cyber 730 are configured in one cluster with 262K 60-bit words of main memory and sharing 2M bytes of extended main memory. Peripherals include 20 CDC 669-4 and 667-4 tape drives and 117 CDC 844-41 disk drives, the firm said.

Software on the Cybers includes DAC-11, System/2000, APT, Basic, Ansi Cobol, Fortran Extended and APL, according to McAuto.

## Network Design

McAuto is linked to its customers via low-speed and high-speed data communications networks accessed via approximately 1,500 modems. McAuto's low-speed network consists of five network processors and 20 statistical multiplexers in its branch offices.

The network is based on a Digital Communications Associates, Inc. System 115 minicomputer processor. The

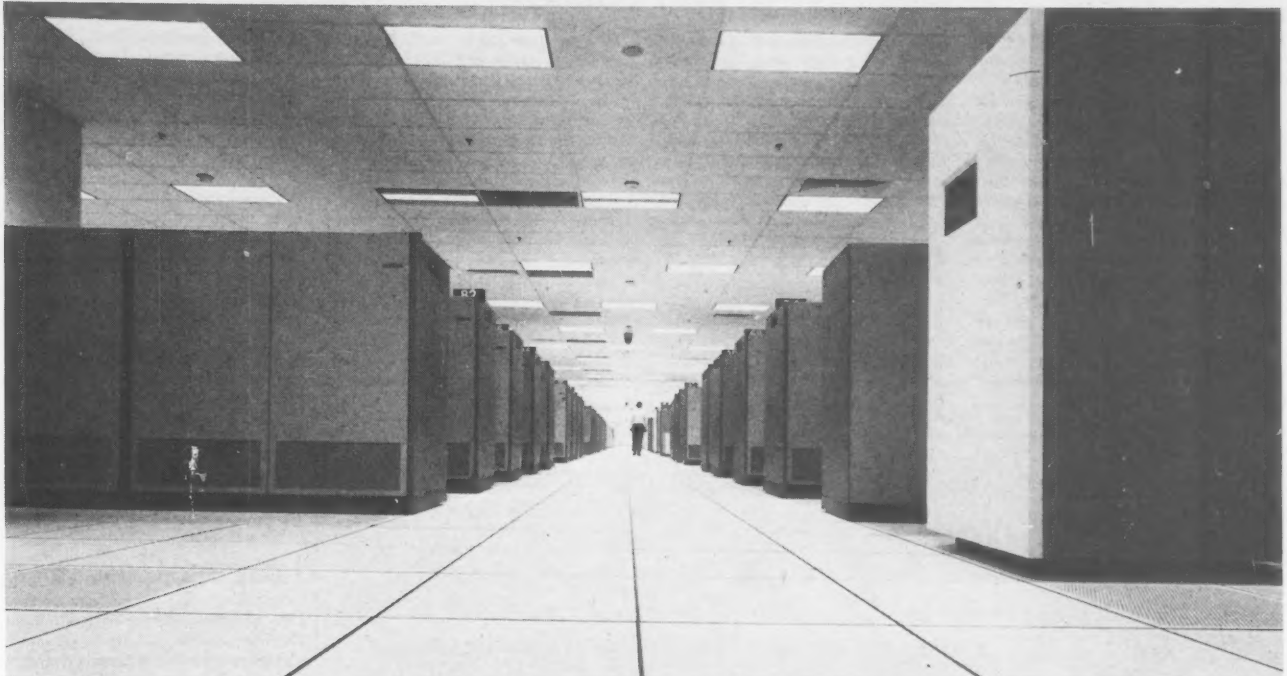
(Continued on Page 32)

## MCAUTO'S HARDWARE INVENTORY

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# Claims World's Biggest DP Center



Row upon row of computers are shown in the 450-foot-long building that houses \$130 million worth of computers at the McAuto center. The center contains 13 large IBM and Control Data Corp. computers that have the equivalent

processing power of 23 IBM 370/168s computers.

McAuto claims it is the largest known concentration of computer power under one roof.

## Security Sealed With Redundancy and a Prayer

By Tom Henkel  
CW Staff

ST. LOUIS — How do you make sure the world's largest data processing facility is secure? You try and keep up with current security methods, build in as much redundancy as possible and pray the whole center isn't wiped out by a disaster.

Asked what special security measures have been taken at McDonnell Douglas Automation Co.'s (McAuto) new computer center, President A. Joseph Quackenbush said McAuto is as good as — but not necessarily better than — the rest of the industry. When it comes to data security, Quackenbush said there is a long way to go before data can actually be considered secure.

McAuto seems to employ basically standard procedures for its internal security. Employees are restricted to the areas that affect their jobs. The amount of security clearance increases with the job.

To secure access to McAuto computers — and to protect users' data — McAuto uses a somewhat unique method. When a customer calls the St. Louis facility, he gives his name, access code and other pertinent data to several telephone operators. The operators then look up that user's file and call him back.

This method, the firm says, adds a double level of security. If an unauthorized person happened upon a given client's access codes, he could not get to the McAuto computers from a remote location. But Quackenbush is quick to point out that, at least at this point, no security method is foolproof.

When it comes to disaster recovery,

McAuto may have a problem. Quackenbush said there is enough redundancy built into the McAuto system that the firm could rebuild data stored at the St. Louis facility at the smaller data center in Long Beach, Calif. But if the St. Louis center were rendered useless, Quackenbush could not estimate

how long it would be before McAuto customers would be without computing power.

But McAuto's Executive Vice-President-Commercial, Robert Harmon, said the computing center is ready for just about any natural disaster. The center has a 5,800-head sprin-

kler system, 1,500 smoke detectors, fireproofed columns and fire walls throughout the complex.

In addition, the center has its own fire station located in the building's energy center. The fire station houses a 1,250 gallon/min pumper with lad-

(Continued on Page 32)



Customer programs are mounted on tape drives at the McAuto computer center, which contains a tape library housing 130,000 reels. Each 2,400-foot reel can hold 6,250

bytes (characters) per inch. Typed single-space on 8.5-in. by 11-in. paper, the characters on a single reel could form a stack of paper nearly 14 feet tall.

# Mapping System Helps Gauge Tax on Farmland

ARGONNE, Ill. — Alice is a computer image processing system that produces maps to help calculate the potential productivity of agricultural land so counties here can comply with the recently amended Illinois State Land Assessment Law.

The law requires that tax levels for agricultural land be based on the land's agricultural productivity rather than its commercial value. Determining this information manually could take up to two years for a given county, but Alice can do the job in about eight to nine months, according to Bob Lima, a consultant working for the Argonne National Laboratory where the system was developed in the Applied Mathematics Division. The laboratory is operated by the University of Chicago,

under contract from the Department of Energy.

Alice combines maps that show soil types with maps that show land ownership parcels to produce one map that gives the size for a given soil type area and shows who owns it.

This information is then compared with Illinois state indices that come up with an average productivity level on which the tax can be based, taking into account such variables as farming techniques, erosion, land slope and fertilizer levels.

## Digitized Data

To establish this single data base from the two sources, Alice must first digitize the information on the two maps. This is done with specially de-

signed scanning techniques developed at the Argonne National Laboratory.

The soil type maps show two colors that distinguish the change in soil makeup. Alice, using a light source or CRT, bounces a light point off the map. Photo detectors reflect the light, divide the area into shades of gray and give digital values to the different regions for the computer to process.

The digital coordinates allow the computer to calculate the different acreage of the parcels based on the soil type.

The land parcel maps that show ownership boundaries are similarly digitized by the scanners to come up with corresponding acreage parcel. This land parcel information is superimposed on the soil type maps to

produce the single data base that shows which soil types are cultivated by which farmer and how much land is in each soil type parcel.

The information is now in a form the state can use when it analyzes the maps to come up with productivity, according to Lima.

At present, Alice is being tested in Will County, Ill., although other counties are expected to use the system. Lima also mentioned that the technology is used by other states that have similar farm land assessment laws.

Although Alice can work during three shifts at the Argonne National Laboratory facility, it is only running on one at present using the laboratory's Digital Equipment Corp. PDP-11 minicomputer.

Lima added that Alice is a dedicated system designed and applied to environmental problems and can be used in similar studies that require this type of map analysis.

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THE SMART ALTERNATIVE IN COMPUTER SYSTEMS

## McAuto Boasts Largest Center

(Continued from Page 30)

DCA system has 115 statistical multiplexers that channel terminal traffic from nearby users into the backbone network, McAuto said.

### Multistar Net

The batch network is based on Comten, Inc. front-end processors and remote concentrators linking hosts to hosts and terminals to hosts in a switched multistar network. There are remote concentrators in Chicago, Houston and Florham Park, N.J., that route batch communications traffic to the host processors in St. Louis and the firm's smaller data center in Long Beach, Calif.

McAuto's high-speed and low-speed networks are linked through host CPU software, allowing jobs entered over low-speed lines to be processed in batch, and jobs entered through batch networks can be routed back to the user over low-speed networks.

McAuto has a third computer center about a mile away from the new St. Louis facility. That center provides computing services to 1,150 hospitals, clinics and health care organizations. McAuto also provides — in addition to remote data processing — applications software to the engineering, construction, insurance, manufacturing and distribution industries, the firm said.

## Security Sealed With a Prayer

(Continued from Page 31)

diers; it can draw on the building's 150,000-gallon chilled water storage tower in an emergency.

The computer rooms are protected by halon 1301 systems that release gas through the raised floor if a fire is detected.

Since McDonnell Douglas deals in many government aircraft contracts, top-secret projects are not carried out at the St. Louis facility. Quackenbush said those programs are either stored on government computers or on other McDonnell Douglas processors.

# Loss of \$102 Million Reagan Seeks to Ax NSF Science Education

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — As part of its far-reaching budget-cutting exercise, the Reagan administration has proposed terminating all science education programs of the National Science Foundation (NSF) for fiscal-year 1982.

While the computer industry has by and large not felt the sting of the administration's budget reductions, the funding cut proposal will probably be distressing to those in the industry — and they number many — who are becoming increasingly alarmed at the shortage of students graduating with engineering and computer science degrees.

For a nation that invests about \$130 billion a year in education, the loss of the \$102 million that had been proposed in President Carter's fiscal-year 1982 budget for the NSF programs may not seem all that significant.

The Carter-recommended funds, which constituted a 38.7% increase for this line item over fiscal-year 1981 expenditures, were not, of course, specifically targeted at alleviating the problems of the computer industry.

There is no doubt the industry faces an unmet demand for more highly educated graduates and more university professors to train them. And there is no doubt about the severity of the problem. An NSF report released several months ago predicted a shortfall of about 300,000 persons receiving baccalaureate or masters degrees in computer science between 1978 and 1990 [CW, Nov. 3].

The report also estimated there are currently 200 faculty vacancies in college departments specializing in the computer profession and as many as 2,000 unfilled positions on the staffs of university engineering departments.

A more recent study, by the Computer Science Board, reported the number of computer science faculty has barely increased in five years [CW, March 16].

## Congress Acts

The NSF report recommended more joint university-industry programs to tackle the problem, but Congress has also shown an awakening awareness of the situation and an increased willingness to do something about it.

Prompted by the dismal findings of the NSF study, the Senate Science, Technology and Space Subcommittee last month convened a special hearing on science and technical education in Albuquerque, N.M.

Opening the hearing, Sen. Harrison Schmidt (R-N.M.) told the assemblage of witnesses from academia and high-technology industries of his "conviction that the economic and national security of this nation are dependent in large measure on the vitality and innovativeness of our science and technology."

More recently, Schmidt's counterpart in the House of Representatives, Rep. Doug Walgren, held several days of hearings on science and engineering education.

Walgren expressed particular concern about the "shortage of engineers, computer scientists and the teachers to train them."

Putting the problem in a larger perspective, lead-off witness, astronomer and popular scientist Dr. Carl Sagan told the House subcommittee our national survival and perhaps even our survival as a species may well depend on how well we understand and use the tools and products of science.

Responding to Sagan's remarks, Walgren said it is vital to decide how the NSF can ensure the quality of science education in the U.S. and to determine how "with its small budget it can make any dent in a problem of such large dimensions."

It was in that atmosphere that NSF Director Dr. John B. Slaughter appeared March 10 to tell the Walgren

panel that the "small budget" had been pared even more and cut completely in the area of science education.

Slaughter put as good a face on the reduction as possible, pointing to the "overriding need to reduce government expenditures."

The NSF director said, "Given the hard choices which the administration has had to make, I believe the only proper course is to concentrate on the research activities of the foundation and reduce or eliminate those other activities that, however desirable, do not directly and immediately serve this purpose."

He noted the foundation will continue to support for the second and

third years fellowships awarded in prior years and expressed hope that when economic conditions improve "we can consider efforts to encourage excellence in science and engineering education."

Computer industry observers, however, have recently noted that the fiscal restraints faced by the federal government are not unknown to private industry.

Few companies are willing or able to increase their commitment to university research and education programs, which, with the present level of activity, or inactivity, by the federal government, leaves a vacuum in needed science and engineering education.

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## Addressing Fears Over Ecom Bolger Favors Laws Ensuring EMS Competition

By Jake Kirchner

CW Washington Bureau  
WASHINGTON, D.C. — Postmaster General William F. Bolger said recently he would back legislation to ensure the U.S. Postal Service (USPS) never competes with private electronic message systems (EMS).

Addressing a March 11 meeting of the Computer & Communications Industry Association (CCIA), Bolger reiterated past statements that USPS electronic mail services will use private transmission facilities and that the Postal Service is interested only in meeting its mandate to provide universal delivery of hard-copy messages.

The USPS Electronic Computer-

Originated Mail (Ecom) service, scheduled to begin early next year, will never evolve into a so-called "level three," or point-to-point, electronic mail system, as many in private industry fear, the postmaster general asserted.

The Postal Service has always taken advantage of modern technology to move the mail, he noted, but promised that just as USPS does not own the airplanes that carry its mail it will not own the transmission facilities that bear Ecom and later EMS.

"In line with historical precedent we do not intend to own such systems... We will not own such systems," he declared. "Our plans for electronic mail

systems are not prompted by delusions of grandeur" or by desires to compete with private industry, he said.

"It's logical for us to form an amicable partnership," he told the gathering of CCIA member company executives. He told the meeting the USPS foray into electronic mail will be guided by five principles:

- The Postal Service will not use revenues from existing mail services to subsidize its electronic mail offerings.
- USPS will not seek congressional subsidies for the new services. The estimated \$32 million needed to get Ecom off the ground will be raised by borrowing in the public money market. He conceded, however, that be-

cause the loans will be backed by the federal government, USPS does have an advantage over private EMS providers in raising capital.

- The Private Express Statutes, which give the Postal Service a monopoly on letter delivery, will not be invoked to hinder development of private electronic mail offerings.

- USPS will not provide point-to-point electronic transmission services.

- The Postal Service will not own or operate any electronic transmission facilities but will lease all connections from common carriers.

While Bolger's promise of noncompetition with private industry was received enthusiastically by the CCIA members, association president Jack Biddle said the group would like to see Congress pass a law insuring that policy is not charged by later postal administrations.

Bolger replied the USPS has already worked on language for "simple, understandable legislation preventing the Postal Service from offering level three services."

With further prompting from Biddle, the postmaster general said he would welcome industry participation in drafting such legislation and vowed to be a willing and forceful advocate of it on Capitol Hill.

## Banking Meet Slated for N.Y.

NEW YORK — The 33rd Annual Operations Conference and Exhibit of the National Association of Mutual Savings Banks (NAMSB), will be convening here tomorrow.

Some of the areas of banking to be addressed at the four-day meet will be future directions for savings, strategic planning for mutual savings banks, profit improvement, tax planning, debit cards and corporate services, to name a few. Altogether, this conference boasts three general sessions, 22 concurrent panel sessions, 20 workshops, 20 group discussions and a special social/business program for spouses.

Operating in tandem with the conference will be the savings bank industry's major annual trade exhibition, in which some 70 equipment manufacturers and suppliers will showcase their products.

Admission is \$55 before March 15 for savings bank representatives, and \$150 for nonbankers. Single-day entry is \$35 and \$45 respectively. More details can be obtained through the NAMSB headquarters at 200 Park Ave., New York, N.Y. 10166.

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# FCC Chief Sees Custom Calling II as Basic

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — Custom Calling II, the controversial voice-based electronic message service proposed recently by Bell Telephone Co. of Pennsylvania, should be a basic rather than an enhanced offering, Federal Communications Commission (FCC) Commissioner Anne P. Jones said here last week.

Her statement appeared to support AT&T's views on Custom Calling II, which are vigorously opposed by Bell's

competitors, including several in the computer industry.

The comment also may presage how the commission will decide a pending petition from a trade association representing commercial telephone answering services. The petition seeks a declaratory ruling from the FCC that Custom Calling II is an enhanced service, as defined in the Second Computer Inquiry Decision it issued last December. Thus, if the FCC declines to issue the declaratory ruling, it is likely to alter significantly the thrust of the inquiry decision and help AT&T operating companies establish a foothold in the on-line information services business.

Commissioner Jones' remark about Custom Calling II was one of several

she made on controversial topics during an appearance at a meeting of the Computer & Communications Industry Association, (CCIA). One comment got her into a spirited discussion with the audience about whether the FCC was justified in not requiring divestiture of Western Electric Co., Bell Laboratories and other key elements of the Bell System. Her key point was that the separated subsidiary scheme favored by the commission is in the public interest. General CCIA members said there was no evidence to support this view and the separate subsidiary arrangement would not prevent continuation of past AT&T abuses. Jones acknowledged these abuses, but said AT&T is "talking and acting differently today."

On another matter — a proposal that would require the subsidiaries created by the computer inquiry decision to perform their own manufacturing and research and development — Jones indicated she is not convinced such a change is necessary, and that at least two other members of the present five-member commission share her views.

The decision, as it now stands, allows Western Electric to manufacture the terminal equipment marketing by the subsidiaries and also permits Western Electric and Bell Labs to perform most of the related R&D. The National Telecommunications and Information Administration (NTIA) recently proposed a change that would require transfer of these functions to the subsidiaries.

## Yankee Group Offers Analysis Of IBM Products

BOSTON — The Yankee Group has announced a subscription consulting service that offers financial and strategic analysis of IBM products.

Called Inquiry: IBM, the service will offer information such as residual values of IBM processors, details on future IBM announcements, IBM software strategies and information on how IBM strategies will affect the overall corporation, the Yankee Group said.

By subscribing to the service, The Yankee Group said clients will develop a better understanding of IBM's products, motivations and strategies. Via a monthly memorandum, clients will be given product analyses outlining the strengths and weaknesses of specific IBM systems, the firm said.

The service offers quarterly assessments of residual values, individualized client consulting, and four major Yankee Group reports: IBM's Hardware/Operating Strategies; IMS to System/R: the Relational Migration; SNA: What Does It Mean (an analysis of IBM's network/distributed data processing strategy); and GBC: The User Interface, the firm said.

In addition, Inquiry: IBM offers surveys of user reactions to new products and access to the Yankee Group research staff via a call-in/call-out service, the Yankee Group said.

The program will be directed by the Yankee Group's research director Dale Kutnick. The program costs \$7,500, with discounts available to Yankee Group clients, the firm said from P.O. Box 43, Harvard Square, Cambridge, Mass. 02138.

## Bell Chairman Brown To Keynote EIA Meet

WASHINGTON, D.C. — Charles L. Brown, chairman of AT&T, will be the keynote speaker at the sixth annual Hyannis seminar, "Telecommunications: Trends and Directions," sponsored by the Electronic Industries Association's (EIA) Communications Division in Hyannis, Mass., May 26-28.

The seminar will include three half-day panel sessions presented by executives from publicly held telecommunications manufacturing and operating companies.

The conference costs \$300 for the three days and more information is available from EIA Communications Division, 2001 Eye St., N.W., Washington, D.C. 20006.

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August Bequai

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## Phase II of Computerization Of N.Y. Emergency Services Saves Lives in Manhattan

CW New York Bureau  
NEW YORK — If you live in Manhattan, this computer could save your life.

New York City's Emergency Medical Service, which is responsible for supplying emergency medical treatment to the area, implemented Phase II of its plan for computerization of its services here last week.

A \$650,000 computer-aided dispatching system composed of two Digital Equipment Corp. PDP-11/70 CPUs (one used solely for backup purposes), four RP06 disk drives, two DEC and one IBM high-speed printers and Lear Siegler, Inc. ADM-42 terminals has been put into operation in Manhattan. The system is expected to go city-wide when all the bugs are ironed out, officials said.

Emergency Medical Service handles between 1,500 and 2,000 emergency calls a day and expects to save at least one minute off its 16-minute response

time with Phase II. Calls are received through the police 911 emergency telephone center and are then dispatched to the Emergency Medical Service headquarters in Maspeth, Queens.

The Emergency Medical Service dispatcher enters information into a split-screen terminal used as either a unit status monitor, which shows the condition of ambulances available, or as an operations screen that will display calls, recall assignments, system status, time, date, unit and messages.

With the help of the Police Department's Special Police Response Inquiry Network (Sprint) software package and PRC software of California, every address in the city has been programmed into the Emergency Medical Service system and is verified as authentic by the computer when a dispatcher inputs information. The system then tells which ambulance is closest to the scene of the accident or injury.

## Brooks Act Author to Speak At Federal DP Expo April 14

WASHINGTON, D.C. — Rep. Jack Brooks (D-Texas), chairman of the House Government Operations Committee and author of the Brooks Act that regulates federal computer system procurement and usage, is the keynote speaker at a plenary luncheon on the first day of the Seventh Annual Federal DP Expo for U.S. government DP professionals, April 14-16 here.

Brooks, who recently authored the Paper Reduction Act, which deals with information management in government procedures, will discuss the various strategies for implementing the statute.

The Federal DP Expo will feature a 34-session conference and more than 150 computer-related exhibits at the Sheraton Washington Hotel, according to the show sponsors, the Interface Group.

The show has five day-long professional seminars and four three-hour workshops that cover such topics as the procurement process, system de-

velopment and life-cycle management and trends in software and services in the Federal DP environment.

Other speakers include Walter L. Anderson, senior associate director, General Accounting Office; Dr. Ruth Davis, corporate consultant and former assistant secretary of resource application at the U.S. Department of Energy, and Kenneth Showalter, staff director, Policy Group on Information and Computers, U.S. House of Representatives.

Registration costs \$150 for three days, which includes the Plenary Luncheon sessions, conference sessions and exhibit-floor admission. One-day conference admission, a Plenary Luncheon and exhibit-hall admission costs \$75 and exhibition-only admission is \$10.

There is a charge of \$50 for the day-long professional seminars. More information is available from The Interface Group, 160 Speen St., Framingham, Mass. 01701.

## Report Eyes Copyright Issues

ST. LOUIS, Mo. — According to Educational Programming Systems, Inc., when a software proprietor begins to consider a legal means of protection for his product he usually looks at copyright, patent and trade secret approaches first to determine the method that will give him the greatest protection. At this point, he has already made his first mistake.

So begins the test of *Computers, Copyright and the Law*, a newly published report examining the issue of legal protection for computer software. The report is the product of the Technology-Assisted Learning Market Information Service (Talmis) of Educational Programming Systems.

The study introduces readers to the theories behind protection, that is, dis-

closure vs. nondisclosure, but the main thrust of the report is a detailed analysis of the pros and cons of the three major proprietary protection methods as they relate to the primary means of dissemination of software products: sale, lease and license. Particular attention is paid to the Copyright Act of 1976 and the protection afforded by the newly enacted Computer Software Copyright Act of 1980. The case of *Data Cash vs. JS&A Group* is cited as a prime example of what not to do when protecting one's software by copyright.

More information can be obtained from the Marketing Department of Educational Programming Systems, Inc., 1328 Baur Blvd., St. Louis, Mo. 63132.



## Industry Aid Sought URI Researchers Set Sights on Robot Vision

By Bruce Hoard

CW Staff

KINGSTON, R.I. — Vision for robots is in plain sight here at the University of Rhode Island (URI). Not needle-threading vision, but the somewhat blurry precursor of the sight required by the in-

goal is to figure out how to make robots intelligent enough to perform new tasks," the professor explained. We're making decent progress, but there are tough problems to overcome.

### Mark IV at Work

Much of the progress has come in the robot research lab across the hall from Birk's of-

fice. It is there that Mark IV sits dispassionately before two bins of metal cylinders. Mark IV earned its name by being the fourth robot assembled by the group.

Mark IV uses a robot arm consisting of a three-axis linear positioning table, a cantilever and a three-axis rotary wrist. Its motion is monitored and directed through an

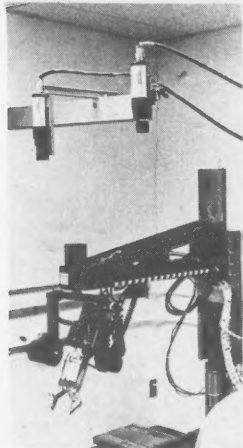
Anorad eight-axis controller.

When electronic life is poured into it, the machine appears both poised and contemplative. Powered by a 64K-byte Computer Automation, Inc. minicomputer and guided by two General Electric Co. TN 2200 cameras staring from above, it drops deliberately toward the bin to its right. With coiled cords pouring

out its nostrils, the steely jaw draws a bead on one of the metal cylinders (each about the size of a role of quarters) awaiting it.

Seemingly without hesitation, it surrounds the target, clenches it firmly, pivots right and drops the metal slug down a trough. From there, the robot swings back to the left and

(Continued on Page 38)



CW Photo by B. Hoard

Mark IV "sees" with the help of two overhanging cameras.

dustrial robots of the future.

Researchers at the URI Robot Research Group have been working on vision and other robot technology since 1971, when six small groups of graduate students were each assigned to work on a joint in the school's first robotic arm.

### 'Orienting' Robots

The research group has since gained national and international attention as one of the most advanced developers of "orienting" robots. Equally important, it has gained the financial backing it needs.

An orienting robot might also be called a parts-feeding robot, according to Dr. John Birk, professor of engineering and a task leader in the research group.

Speaking from his small cramped office and surrounded by such books as *Structured Computer Vision* and *Pattern Recognition and Signal Processing*, Birk described the orienting process as an effort to locate, lift and deposit a given object.

"At the highest level, our



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# URI Research Group Sights Vision for Robots

(Continued from Page 37)  
repeats the process in the other bin. Elapsed time for both tasks: about 15 seconds.

## Vision Process

The robot's TN 2200 "eyes" convey a blurry, but not indefinable, picture of the cylinders' configuration to the adjacent Grinnel Systems Corp. GMR-27 raster graphics display generator, where a watchful technician monitors the proceedings.

In this case, the technician was engineer Richard Tella, former URI student and now full-time employee. As the robot jaws descended, he described the vision process. In use is a binary-based system designed to reflect light and darkness, and there is a threshold

point at which everything falls into one of the two categories, he explained.

"As the jaw drops, it becomes oriented perpendicular to the piece," he noted. "It finds its major and minor axes."

Although it lacks depth perception, the arm knows it has reached far enough when it makes contact with the cylinder, breaking a beam of light shining from a light-emitting diode in the jaw, Tella said.

"Gray-scale vision" is another, more sophisticated vision system that takes more processing time. It focuses on the tonal qualities of a given object and can pick out minute differences in shade. It is less sensitive to ambient light conditions than to the binary sys-

tem, Tella said, adding that commercial robots such as those from Automatix, Inc. rely on the binary version.

One of the most nettlesome problems with any form of robotics vision is the extensive memory reserves it commands, according to Birk. For instance, one 256-by-256 8-bit image array greedily consumes 64K bytes of storage. URI utilizes a slightly less voracious 128-by-128 array, ameliorating the problem somewhat.

## Industry Commitment

Down the hall, there is more robotics activity. A jet-black Unimation, Inc. Model 500, looking for all the world like a perpetual-motion drinking duck, pecks away with its vacuum cup hand at a box of empty Vaseline Intensive

Care plastic bottles.

The choice of containers is not accidental. They reflect Cheeseborough Ponds, Inc.'s corporate commitment to URI's robotics industry plan, a commitment that will garner Cheeseborough Ponds and up to 19 other large businesses substantial future concessions (see story this page).

Puma (programmable universal machine for assembly), the black robot, is "blind" and relies on a 25-step program to guide it through its duties. Hardware support for this six-axis arm is supplied by a vendor-donated Texas Instruments, Inc. 990/12 processor with 256K bytes of memory.

Although the sightless robot can successfully pick out of the box only 40% to 50% of the bottles — as opposed to 90% to 95% for the Mark IV — it can still be applied usefully for that purpose in an industrial setting, according to Tella.

"If you use multiple arms, you can achieve the same degree of success as the other one," he said, referring to the Mark IV.

Most of the financial backing for the Robotics Research Group thus far has come from the National Science Foundation, which contributed \$110,000 in 1980 and is expected to kick in \$210,000 this year, Birk said.

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## Backing Sought For Robots

KINGSTON, R.I. — The University of Rhode Island (URI) Robotics Research Group undertook an ambitious program last Sept. 1 designed to provide researchers here with an annual operating budget of \$500,000.

Industrial cooperation is the key to the program, and URI is seeking 20 firms to donate \$25,000 each annually. In exchange for their investments, the companies will derive a host of returns, including reports and presentations, workshops and seminars, patent privileges, individual meetings, recruiting privileges and an opportunity to place engineers in residence.

So far, five companies have signed on, and another five are on the verge of doing so, according to Dr. John Birk, professor of electrical engineering and one of 20 senior robotics research group members.

The five are Unimation, Inc., GTE, Cheeseborough Ponds, Inc., Western Electric, Inc. and Textron, Inc. Birk declined to name potential additional members.

Although the robotics research group received \$110,000 from the National Science Foundation (NSF) in 1980 and is expecting \$210,000 this year, Birk is not happy with the overall support the federal government is contributing to robotics development.

"The level of support is inadequate from the federal government," he said. "The whole society could profit in a decade from the type of knowledge generated in research organizations."

Nonetheless, Uncle Sam is still the most likely source of funds, he said. "There is an opportunity to seize and the only people who are going to seize it are those supported by the federal government," the professor commented, somewhat paradoxically.

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# 'Antique Matchmaker' Links Dealers, Collectors

By Lois Paul

CW Staff

AMHERST, N.H. — Antique buffs in

## Courses Target Corporate Arena

OAK BROOK, Ill. — A series of courses designed to teach students to organize and author their own courses in the field of corporate computer-based training (CBT) has been announced by Deltak, Inc.

Using IBM's Interactive Instructional System (IIS) as the base language for the courses, Deltak said, students will be taught a variety of data processing skills to extend the computer's potential for increasing productivity into the area of corporate training.

As a result, students will be able to author courses that are unique to their individual needs and can lease or purchase generic courses needed in their training library, the company said.

"Authoring in IIS Coursewriter," the initial course series, consists of two introductory videotapes, two manuals and a computer-based tutorial course designed to present an overview of the CBT course and familiarize managers with the IIS administrative commands needed to organize a training program.

The on-line portion of the course is an interactive tutorial written in IIS Coursewriter language which teaches students how to create their own courses in the same language.

At the conclusion of the first series, students will be able to use and create macro-subroutines and interactive courseware, code any structured material suitable for CBT, program reporting routines and modify existing programs written in IIS Coursewriter.

The second series of courses, "Authoring With the IIS Course-Structuring Facility," will consist of the same type of course materials used in the first series.

The company will provide other IIS courses that teach the elements of courseware design, as well as a generalized series of video courses on IIS.

A curriculum of CBT data processing products will focus on programming languages, data base and data communications software and other computer operator skills.

The course and materials may be purchased at \$1,200 each or leased for between \$50- and \$125/mo from Deltak, Inc., 1220 Kensington Road, Oak Brook, Ill. 60521.

## Computerist's Guide Has 200 Listings

SANTA ROSA, Calif. — Alternet, Inc. has announced the publication of the first issue of "The Community Computerist's Directory," published in January, which contains more than 200 listings of people and companies in the computer industry.

The directory is made of 500 character-listings written by the participants and includes phone numbers and addresses. The next issue, scheduled for July, will have more than 500 entries, the publishers said.

The directory costs \$4 and is available from The Community Computerist's Directory, P.O. Box 405, Forestville, Calif. 95436.

New England who are struck by an irresistible urge to find that Hep-plewhite chair they have always wanted no longer have to scour the shops of area dealers, wasting gas and time while the price of their intended treasure climbs ever higher.

They can place one quick call to the Antique Matchmaker, a computerized service developed by Richard and Emily Walker, and obtain a list of all the dealers who have that particular piece that has been the object of a life-long quest.

Dick Walker, an electronics engineer, developed the service, which is managed by his wife, Emily, an antique dealer, in November 1980 using an Apple Computer, Inc. microcom-

puter.

Antique Matchmaker is a New England-based service, Emily Walker explained, noting that, "We have been told this has been tried before on a national basis."

### Service Process

Essentially, dealers lists items they wish to sell with the service and these are entered into the computer. A potential buyer then contacts the service either by mail or by telephone with a description of the desired piece.

If descriptions match, Antique Matchmaker, like a good computer dating service, sends the buyer the name, address and telephone number of the dealers handling the item being sought. It is up to the buyer to con-

tinue the chase and purchase the item.

"We don't charge a commission, which is unbelievable to people," Emily Walker said. "It is a service. We do not have to exert any energy finding the items involved."

Potential buyers do pay a \$2 per item fee for the service. They mail a description of the wanted item with a self-addressed stamped envelope. An alternative is a \$10/mo telephone account whereby buyers have an unlimited number of inquiries.

According to Emily Walker, the service is working well. "For every 10,000 people out there, there are 10,000 different things they are looking for, from fountain pens to thousands of dollars worth of furniture," she added.

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The B-900 was designed for high performance, printing up to 1100 lpm with a 48 character set. It prints out 900 lpm with 64 characters and 670 lpm with a 96 character set.

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the operator in mind. The long lasting ribbon cartridges are easy to load.

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# GREAT MOMENTS

# If 'Greenhouse Effect' Continues Glacial Meltdown Model Waters Coastal Hopes

"Where can we go when there's no San Francisco? Better get ready to tie up the boat in Idaho."

— Calypso song of the 1950s

By Bill Laberis

CW Staff

ORONO, Maine — Imagine rivers of seawater coursing down the concrete canyons of New York City, lapping the sills of third-floor windows while the crags of Central Park struggle for air above the surging tides.

Or picture sailing a deep draft sloop up the Hollywood Freeway in Los Angeles, plying towards the gentle waters of the valleys to the East.

Even if you can't imagine such a des-

tiny for our major coastal cities, an IBM 370 at the University of Maine has generated this image.

Furthermore, the forces at work in the computer model of a glacial meltdown may in reality be churning at this minute, grinding irreversibly, with plenty of help from man, toward a final, watery fate.

Glaciologist Dr. Terrance J. Hughes and others at the university here devised the Climap (Climate; Long-Range Investigation, Mapping and Prediction) polar ice sheet disintegration model, feeding into the school's mainframe reams of input on glacial dynamics.

The most salient feature of the input

was a computer projection that atmospheric levels of carbon dioxide (CO<sub>2</sub>) will double over the next 100 years because of the global combustion of fossil fuels.

## Greenhouse Effect

The CO<sub>2</sub>-enriched atmosphere produces the so-called "greenhouse effect" whereby the earth's natural radiational cooling capabilities become inhibited, the computer predicted. This will result in an air temperature increase of up to 10 degrees Celsius, a change which, according to the computer, could trigger a cataclysmic chain of events in West Antarctica culminating in the sea level's rising

some 20 feet around the globe.

Understanding this potential geological disaster requires a brief explanation of the nature of polar ice masses, Hughes explained.

But it is largely a question of balance, an extremely delicate meteorological balance.

Pinned to the ocean floor, the West Antarctic ice sheet is more than two miles thick in places and covers an area as big as the U.S. west of the Mississippi River.

The ice sheet includes a fringe of floating ice shelves that have over the last 20 millennia, become unpinned from the ocean floor. Some of these floating shelves have long since broken into icebergs and melted away.

Just as flowing rivers drain a land mass, so a network of ice streams — fast-moving rivers of ice — drains the West Antarctic ice sheet.

In a condition of static equilibrium, these ice streams drain away an amount of ice equal to the precipitation above, minus any surface evaporation, Hughes explained.

## Chain Reaction

But when the computer interjected variables of changing temperature conditions over the long haul, the static situation was shown to disappear rapidly, melting into an unstoppable chain reaction.

First of all, increased melting around the fringes caused by higher temperatures will dump more ice and water into the ice streams, causing their flow to accelerate.

As they pick up speed, there results a pronounced increase in the streams' erosive effect on the ice sheet, especially where undersea ice streams course by the ice sheet's underpinnings.

Eventually the underpinnings give way, and the unbuttressed ice sheet becomes a floating ice shelf. The surging ice streams surge more fiercely, weakening the remains of the ice sheet, while downstream the floating ice shelves begin to break up into icebergs.

## Pine Island Bay

"We've identified the Pine Island Bay area as a place where just this sort of thing appears to be happening," Dr. Hughes said. "We call it the weak underbelly of the West Antarctic ice sheet, and our model points toward present and future drawdown of the ice sheet by the surging ice streams. Eventually the whole sheet will collapse."

But when? Should all coast dwellers rush to apply for federal flood insurance? Should we don our sou'westers and take to the high ground?

No, Dr. Hughes said, not yet. But our children's children's children might well be affected toward the end of the next century, with the full brunt of the climatic apocalypse felt about a century later.

What's worse, he said, there may be little that can be done about it, given the technological limitations and the strains of industrial growth expected around the world.

"What are you going to do?" Dr. Hughes asked rhetorically. "Build a wall around the coasts?"



typewriter. These cabinets are available on the B-300 and B-600, standard on the B-900.

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# TS IN PRINTING

## Calendar

April 6-8, Ottawa — **International Symposium on Computer Message Systems.** Contact: Ifip TC-6 Symposium '81, Bell-Northern Research, Department 3D20, P.O. Box 3511, Station C, Ottawa, Ont., Canada, K1Y 4H7.

April 6-8, Dallas — **Understanding and Using Computer Graphics.** Contact: Frost & Sullivan, Department C-2, 106 Fulton St., New York, N.Y. 10038.

April 7, Chicago — **Information Technology Trends and Future Impacts.** Contact: Asis Chicago Chapter, c/o Marlene Kozak, American Critical Care, 1600 Waukegan Road, McGraw Park, Ill. 60085.

April 7 & 8, Washington, D.C. — **Increasing Job Productivity Through**

**Computer Terminal Selection.** Contact: Joseph Nocerino, CRC Systems, Inc., 4020 Williamsburg Court, Fairfax, Va. 22032.

April 7-9, Topeka, Kan. — **Management of Structured Projects.** Contact: Ken Orr and Associates, Inc., 715 E. 8th, Topeka, Kan. 66607.

April 7-10, Sacramento — **Jovial-Ada Users Group.** Contact: Donna K. Gant, General Dynamics, P.O. Box 214617, Sacramento, Calif. 95821.

April 8-9, Atlanta — **Minicomputers and Microprocessors in Medical Practice Management.** Contact: Donald F. Pugliese, 621 Duke St., Alexandria, Va. 22314.

April 13, Golden, Colo. — **Calpas3 Class.** Contact: Sara Bennett, Berkeley Solar Group, 3026 Shattuck, Berkeley,

Calif. 94705.

April 13, New York — **The James Martin World Seminar: Senior Management Day.** Contact: Technology Transfer Institute, P.O. Box 49765, Los Angeles, Calif. 90049.

April 13-14, Boston — **DP Recruiting: A Challenge for the '80s.** Contact: Management International, Seminar Data Center, Box 5111, FDR Station, New York, N.Y. 10150.

April 13-14, Columbus, Ohio — **Software Engineering.** Contact: Renate Lammernann, Battelle Seminars and Studies Program, 4000 N.E. 41st St., Seattle, Wash. 98105.

April 13-15, Boston, Mass. — **Capacity Planning.** Contact: Technology Transfer Institute, P.O. Box 49765, Los Angeles, Calif. 90049.

April 13-15, Washington, D.C. — **Software Engineering.** Contact: Technology Transfer Institute, P.O. Box 49765, Los Angeles, Calif. 90049.

April 13-15, Los Angeles — **X.25 and Other Packet-Switching Protocols.** Contact: Technology Transfer Institute, P.O. Box 49765, Los Angeles, Calif. 90049.

April 13-15, New York — **Job Control Language.** Contact: Advanced Training Center, Division of Chubb Institute, 480 Morris Ave., Summit, N.J. 07901.

April 13-15, Nashville, Tenn. — **Productivity, People-Building and Perfection.** Contact: Dema, P.O. Box 3231, Stamford, Conn. 06905.

April 13-15, New York — **The Automated Office.** Contact: Department K, Automated Office 4198, NIMR Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

April 13-17, New York — **The James Martin World Seminar: Productivity Through the New DP Revolution.** Contact: Technology Transfer Institute, P.O. Box 49765, Los Angeles, Calif. 90049.

April 13-17, Tucson, Ariz. — **Seventh Annual Reliability Testing Institute.** Contact: Dr. Dimitri Keccegiolu, Institute Director, Aerospace and Mechanical Engineering Department, University of Arizona, Building 16, Tucson, Ariz. 85721.

April 13-17, Chicago — **Systematic Software Design and Analysis.** Contact: Edutech, Inc., Dushun Mosley, Suite 907, 162 N. State, Chicago, Ill. 60601.

April 14-16, Washington, D.C. — **Federal DP Expo.** Contact: The Interface Group, 160 Speen St., Framingham, Mass. 01701.

April 15, Albany, N.Y. — **A Data Base Seminar for Managers.** Contact: Cullinane Database Systems, Inc., 400 Blue Hill Drive, Westwood, Mass. 02090. Also being held April 15, Washington, D.C.; April 16, Charleston, S.C., Houston, and Saddlebrook, N.J.; April 21, Atlanta, Kansas City, Mo., and Philadelphia; April 23, Denver; April 28, Cleveland, Melbourne, Fla., Omaha, Neb., Rochester, N.Y., and San Diego; April 29, Cincinnati, Portland, Ore., and Tulsa, Okla.; April 30, Milwaukee.

April 15, Washington, D.C. — **Fourth Annual Afece Vital Issues Symposium.** Contact: Programs Office, Armed Forces Communications and Electronics Association, Suite 300, 5205 Leesburg Pike, Falls Church, Va. 22041.

April 15, Washington, D.C. — **Electronic Message Workshop.** Contact: STSC, Inc., Suite 1414, 7101 Wisconsin Ave., Bethesda, Md. 20014.

April 15-16, Boston — **Productivity and Performance Planning for Programmers and Analysts.** Contact: Management International, Seminar Data Center, Box 5111, FDR Station, New York, N.Y. 10150.

April 15-16, San Antonio, Texas — **10th Annual ICP Million Dollar Awards Ceremony.** Contact: James D. Staller, Director of Marketing, International Computer Programs, Inc., 9000 Keystone Crossing, Indianapolis, Ind. 46240.

April 16-17, San Francisco — **Automated Tools for Software Engineering.** Contact: Software Research Associates, P.O. Box 2432, San Francisco,

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count structure and fail-soft architecture eliminate any worries about security, control or downtime.

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These are just a few reasons why you should put the BTI 8000 in your starting lineup. For a complete scouting report, contact your nearest BTI office.



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## Calendar

Calif. 94126.

April 20-21, Houston — **DP For Users.** Contact: Management Resources International, 6621 Electronic Drive, Springfield, Va. 22151. Also being held in Tulsa, Okla., April 23-24; and Washington, D.C., April 27-28.

April 20-21, San Francisco — **Metrics for Software Engineering.** Contact: Software Research Associates, P.O. Box 2432, San Francisco, Calif. 94126.

April 20-22, New York — **MVS Dumps Debugging for Applications Programmers.** Contact: Advanced Training Center, Division of Chubb Institute, 480 Morris Ave., Summit, N.J. 07901.

April 20-22, Denver, Colo. — **Project Leadership Workshop.** Contact: BSI, 4720 Montgomery Lane, Bethesda, Md. 20014.

April 20-23, Birmingham, England — **Communications '82.** Contact: Tony Davies Communications, c/o Industrial and Trade Fairs Ltd., Radcliffe House, Blenheim Court, Solihull, W. Midlands B91 2BG, England.

April 20-24, New York — **Data Base Modeling and Design Workshop.** Contact: Tony Formica, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

April 20-24, Chicago — **Design Techniques Workshop.** Contact: BSI, 4720 Montgomery Lane, Bethesda, Md. 20014.

April 20-24, Denver, Colo. — **Structured Systems Design/Structured Program Design.** Contact: Ken Orr and Associates, Inc., 715 E. 8th, Topeka,

Kan. 66607.

April 21, College Park, Md. — **Standardization of Computer Resources.** Contact: Laverne Papian, Washington, D.C., Chapter, Association for Computing Machinery, 1000 Connecticut Ave., N.W., Washington, D.C. 20036.

April 21, College Park, Md. — **Computer Security/Privacy.** Contact: Laverne Papian, Washington, D.C., Chapter, Association for Computing Machinery, 1000 Connecticut Ave., N.W., Washington, D.C. 20036.

April 21 & 22, Portland, Ore. — **Productivity Through Technology.** Contact: Willamette Valley Chapter, International Word Processing Association and Portland, Oregon Chapter, Data Processing Management Association.

April 21-24, Topeka, Kan. — **Structured Program Design for Teleprocessing.** Contact: Ken Orr and Associates, Inc., 715 E. 8th, Topeka, Kan. 66607.

April 21-23, Arlington, Va. — **Computer Performance Evaluation.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

April 21-24, Topeka, Kan. — **SPD for Teleprocessing.** Contact: Ken Orr and Associates, Inc., 715 E. 8th, Topeka, Kan. 66607.

April 20-23, Miami Beach, Fla. — **Data Catalogue Two Users Meeting.** Contact: Synergetics Corp., One DeAngelo Drive, Bedford, Mass. 01730.

April 20-21, Hartford, Conn. — **Vsam Performance Workshop.** Contact: Solutions, Inc., Box 989, Department 21, Montpelier, Vt. 05602.

April 21, 23 and 28, Philadelphia — **Introduction to APL.** Contact: STSC, Inc., Suite 530, The Bourse Building, Independence Mall E., Philadelphia, Pa. 19106.

April 21-24, Washington, D.C. — **Computer Graphics Systems: Design and Applications.** Contact: Director, Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

April 22, Arlington, Va. — **Trends in U.S. Telecommunications Policy.** Contact: Steve Weissman, Information Gatekeepers, Inc., Suite 111, 167 Corey Road, Brookline, Mass. 01246.

April 22, Washington, D.C. — **Introduction to Computer Graphics.** Contact: STSC, Inc., Suite 1414, 7101 Wisconsin Ave., Bethesda, Md. 20014.

April 22-24, San Francisco — **Satellite Data Networks.** Contact: Technology Transfer Institute, Box 49765, Los Angeles, Calif. 90049.

April 22-24, New York — **The Office of Tomorrow.** Contact: Technology Transfer Institute, Box 49765, Los Angeles, Calif. 90049.

April 22-24, Washington, D.C. — **Minicomputers, Microcomputers and Microprocessors for Non-Electrical Engineers.** Contact: Director, Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

April 22-24, Paris — **10th International Banking Seminar — Banks and Computers.** Contact: Insig, 40 Rue de Monceau, 75008, Paris.

April 22-24, Los Angeles — **DP Personnel Management: Recruiting and Maintaining an Effective Staff.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held April 27-29, Chicago.

April 22-24, New York — **DP Operations Today: Effective Scheduling and Console Operation.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held April 27-29, Chicago.

April 22-24, Los Angeles — **Introduction to Word Processing: Concepts, Systems and Applications.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

April 22-24, Washington, D.C. — **Integration of Word Processing and DP Systems.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

April 23, New York — **OS/VS Cobol Debugging Facilities.** Contact: Advanced Training Center, Division of Chubb Institute, 480 Morris Ave., Summit, N.J. 07901.

April 23-24, Woods Hole, Mass. — **Information Resource Management: Concepts, Activities and Regulations.** Contact: Federal Information Processing Council of New England, Mr. Paul Anthony, I.R.S., Stop 480, 310 Lowell St., Andover, Mass. 01810.

April 23-24, Washington, D.C. — **FPS Workshop.** Contact: STSC, Inc., Suite 1414, 7101 Wisconsin Ave., Bethesda, Md. 20014.

April 23-24, San Francisco — **Software Maintenance Technology.** Contact: Software Research Associates, P.O. Box 2432, San Francisco, Calif. 94126.

April 23-24, Tulsa, Okla. — **DP For Users.** Contact: Management Re-

sources International, Inc., 6627 Electronic Drive, Springfield, Va. 22151. Also being held April 20-21, Houston.

April 23-24, Arlington, Va. — **Viewtext '81: International Viewdata Markets and Applications.** Contact: Mr. Weissman, Information Gatekeepers, Inc., Suite 111, 167 Corey Road, Brookline, Mass. 02146.

April 24, Toronto — **Techniques for Software Quality Assurance.** Contact: Violet Foldes, Northern Telecom Canada, Department 1508, 304 The East Mall, Toronto, Canada M9B 6E4.

April 26-30, Miami — **Comunicaciones Expo 81.** Contact: Comunicaciones Expo 81, Gables One Tower, Suite 280, 1320 S. Dixie Highway, Coral Gables, Fla. 33146.

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## EDITORIAL

### For Machines Only

The U.S. Patent Office — not exactly a haven of computing expertise — has some 3,000 applications pending on patents for computer-based systems and processes. What applicants mainly want protected is software or firmware, although apparently the consensus view of American jurists is that copyrights, not patents, are the way to protect such developments in computer technology.

Patents are for *machines*, in other words.

Now the Patent Office must live with two Supreme Court decisions [CW, March 16] that indicate systems and processes are patentable even if based on software or firmware. One decision came on a 5-4 vote, while the other — really a decision not to decide — came from a split 4-4 vote because Chief Justice Warren Burger disqualified himself from involvement. This let stand a lower court ruling that a firmware-based module of Honeywell, Inc.'s Series 60 Level 64 system is patentable.

At a time when manufacturing in general is embracing automation as a way to turn out products more efficiently and cost-effectively, and while computer systems emerge as the only way to make some products, the Patent Office has let 3,000 applications stack up because they depend on software and firmware, which has really become the essence of any significant computer system.

As the Supreme Court cases demonstrate, American jurists will do much to shape the direction and success of the computer industry in coming years, although their rulings may depend more on geriatrics and the politics of presidential appointments than what insight they may have into what computing entails.

Most Supreme Court members are well past 60 years old, as is federal district court judge David N. Edelstein, who presides over the U.S. vs. IBM case, the longest running antitrust trial in American history. Many people are wise and productive at their ages, but it is important to note just how much can hinge on 5-4 votes, split decisions and a single-handed administration of antitrust cases by septuagenarians who may suddenly have to leave cases in mid-stream.

Computing concepts and policy for living with them should be defined by the computing community, not government, except where government's charter as protector of public safety and civil liberties is concerned. Much is risked by letting courts or lawmakers tell the community what its terminology may be.

The recent Supreme Court rulings appear in the best interests of users and vendors. But those rulings could easily have gone another way if one Court member eligible for generous pension benefits had simply not been there to vote.

## DATA PAST

### Five Years Ago March 22, 1976

NEW YORK — "It would be in the best interests of the user, the industry and indeed IBM," for the government to settle its antitrust suit against IBM with an out-of-court consent decree, A.G.W. (Jack) Biddle, president of the Computer Industry Association, said here.

WASHINGTON, D.C. — A bill designed to overturn many of the then-current policies of the Federal Communications Commission (FCC) was introduced in the U.S. House of Representatives. Sponsored by Rep. Teno Roncalio (D-Wyo.), the proposed leg-

islation was called the Consumer Communications Reform Act of 1976 and was designated H.R. 12323. It would have amended the Communications Act of 1934 under which the FCC operated.

### Ten Years Ago March 24, 1971

WASHINGTON, D.C. — The Federal Communications Commission (FCC) reaffirmed its decision that firms that offer communications-related data processing services to users should remain unregulated. The action made final the so-called tentative ruling handed down in April 1970 and officially closed the computer inquiry that began in 1966.



## LETTERS

### Ask the Employees

Computerworld staff writers Ann Dooley, Bill Laberis and Lois Paul should survey the employees of the 30 MIS managers polled for the article "Staff Turnover No Problem, Surveyed Managers Report" [CW, Feb. 23]. Perhaps the managers are not having "nightmares," but what of the employees who must "double up on jobs," have vacations canceled and tighten up schedules — in other words, put the pressure on?

"The hardship of finding qualified personnel" is encountered in those shops who offer few incentives to the personnel. Lack of education, challenge and poor data processing management is enough to discourage the sharpest of programmers. I will bet that the manager with "old hardware" also has the old programs and outdated techniques to go with it.

Motivational experts are correct that money is not a prime motivator in an employee's decision to job hop. The problem lies in lack of education, managerial discouragement in the application of structured design and programming, "dead-end"-ing a person in one area, lack of strong management, no work responsibility or responsibility without the power to uphold decisions and no challenge. Faced with these problem areas, employees will "job hop" for money. If you are unhappy, you might as well be unhappy with more money in your pocket. Programmers will stay in a lower paid position if the true motivators are present.

Recruitment firms can seduce and lure away employees, only when they are so hungry for challenge that they become willing victims. My own feeling on recruitment firms is: Once bitten, twice shy.

Incentives to stay with a firm are frequently offered only after the employee has expressed extreme dissatisfaction or is "walking out the door". Data processing people love learning.

Challenge their abilities and educate them to the changes in the field, if you want to keep people.

Turnover always effects an organization and it is hardest on those who are unprepared for change. How many managers even have an idea, let alone a plan, for replacement in key positions? It has been proven again, in your article of Feb. 23, that a disgustingly high proportion of managers cannot see beyond the end of their noses.

Mary N.B. Holmes  
Mendota Heights, Minn.

### Put Country First

I wonder just how hard Adolf F. Monosson tried to find an owner for the "scrap" equipment that would benefit our country and the home computer hobbyist [CW, Feb. 23]. Many people cannot find a reasonably priced ASR-33 or similar terminal. Western Electric had this problem several years ago with its aging supply of Model 15 and 19 Teletype machines. They were sold at scrap prices to local amateur radio clubs who, in turn, sold them to their members.

Tektronix has run a "country store" for years, allowing its employees and, at one time, the general public to purchase its scrap material at scrap prices. The whole community benefited.

A surplus dealer in Portland, Ore., has shipped electronic scrap to Taiwan for years, but has always allowed local hobbyists to go through the scrap and purchase what they wanted, at scrap prices. The foreign businesses must have really paid a premium to out-bid local scrap dealers.

I would like to challenge Monosson to think of our country first and give the local computer club or amateur radio club a chance to purchase some of his equipment for sale to their members before selling to the highest bidders.

Paul C. Drahn  
Portland, Ore.

## HUMAN CONNECTION/Jack Stone

# Technique No Substitute for Knowledge

John Callahan, a DPer for nearly a quarter century, sent a letter to me expressing his concerns about personnel management within the data processing establishment. He began with some thoughts on the existence (or nonexistence) of professional managers.

"I enjoy your columns each week in *Computerworld* and your recent one about your horrendous job description assignment has prompted this letter.

"The cause you describe — though extreme — illustrates the attempt on the part of DP 'managers' to use techniques and methodology as substitutes for the knowledge of the principles of professional management and their application in daily operations. One such effort is the use of the management-by-objective (MBO) technique

as combined with performance appraisals. That all MBO programs are seriously flawed is made clear by Dr. H. Levinson in his fine book, *The Great Jackass Fallacy*. Levinson introduces his case by stating that MBO is a rug under which is swept the failures resulting from the lack of professional management."

Callahan then turned to the subject of effectiveness of job descriptions and performance appraisals.

"Your job description assignment clearly shows the current (last three to five years) modus of reducing all DP jobs to minute tasks, which are then associated with a set list of objectives combined with a set list of performance factors. Then the DP 'human machines' are given their tasks and a

command to 'forward march' to high productivity output.

"Once I worked for a manager whose performance review system consisted of a salary adjustment figure scribbled on a scrap of paper and a five-minute discussion of it. This 'bare-bones' system was just as effective as the formalized performance appraisal systems that I have endured over the years, none of which seemed of value other than to keep the personnel department and DP managers busy."

## Lack of Professionals

Callahan addressed the dearth of "professional" DP managers.

"There exists a tragic lack of professional managers in our industry. Yes, there are a few who have risen to the VP ranks, having organized the DP departments from the ground level up and constructed a successful operation. But these few are heavily oriented toward the politics of big business. In my view, they are not professional managers; instead they are chaps who have pulled together DP planning, resource evaluation, budgeting and political activism to build a DP department.

"This situation was exemplified by the manager whose letter appeared in one of your recent columns. He reported how he built a motivating atmosphere for his employees, only to be fired by an 'executive.' How many DP managers — or executives — really concern themselves with employee moti-

vation? Have you ever found a DP shop where motivational factors played a featured role? I surely haven't.

"But I have found a way to destroy employee motivation, and that's to run a 'fire-house' operation — as nearly all shops do. DP managers are notorious for their standard cry: 'We are too busy to do the job right, because production must get out the door.' They run their operations on the basis of reaction to expediency rather than action in accordance to plan. These managers are merely technicians whose lack of knowledge of proper personnel management encourages them to treat the employees as 'human machines,' and discourages them from building employee motivation.

"Both the firms and the employees would greatly benefit from the implementation of motivational programs in DP departments. There is a clear need for seminars for DP managers, supervisors, and project leaders designed to make them aware of motivational considerations and give them the basis for developing and implementing motivational programs. A well-motivated DP department — even without layers of control techniques — will outproduce a nonmotivated shop any day! But who is conducting such seminars for DP management? Will the field ever wake up to realize that DP has become a super specialty and technology-driven activity and that DPeres are not machines, they are people!"

## THE TAYLOR REPORT/Alan Taylor

# 'Compliance-Tested' Tools Promise User Benefits

Any day now, new 700-plus-page manuals will be reaching the users of Digital Equipment Corp.'s Construction Management System. And, when that happens, a new type of software will have been introduced.

DEC and its outside testers, Peat, Marwick, Mitchell & Co., are calling the product "compliance-tested software." It involves a technique that can save users worry and money and is by no means restricted to construction packages.

The importance of the new manuals (still on the presses as this is being written) is that Peat, Marwick has certified not only the software, but also the accuracy and completeness of the manuals. This means it has also certified the implementation methods given there, the recommended office and training procedures and all the rest of the documentation — a tremendous advantage for users.

But Peat, Marwick went further.

As an international auditing and accounting firm, Peat, Marwick naturally looked through the accounting theories involved and had them changed as it saw fit.

As issued, the system includes plenty of audit trails. Some of the printouts are now forced, so as to provide more security and controls — items on which any auditor immediately focuses.

## Industry Suitability

In addition, the firm's international management experts looked at the package's suitability for the construction industry. F. Grant White, a construction specialist, checked this through the point of view of the general contractor and the subcontractor. Some of the payable area shows signs of his review.

And, perhaps most interesting, Peat, Marwick's George Rittersbach, a data processing expert, went through the methods of support and documentation that both had been, and were expected to be, used in the future to support users. Again, procedures of product testing, field support and enhance-

ments were tightened up.

Quite a lot was changed in all of these areas, but after four months of work, the compliance letter was issued earlier this year.

Clearly, compliance-tested software is not just a "Good Housekeeping Seal." The Peat, Marwick procedure is probably as comprehensive as can be expected. It gives users both historical and future assurances. One very important indicator of the company's own confidence in the thoroughness of its approach is that DEC's spokesman was able to assure me that there is no "hold harmless" clause in the DEC-Peat, Marwick contract for this work, despite the obvious legal exposure involved.

## User Savings

Some of the compliance testing savings can already be proved in practice, although naturally most of them have not really been demonstrated yet. Already evident is the reduction in the amount of work involved in software evaluation and the removal of the negative influence of accountants who reasonably distrust unknown software and who haven't had the opportunity to go behind the scenes as Peat, Marwick did. Current reports indicate that the package, including hardware, is taking little time to sell. And that benefits everybody.

Installation time is clearly helped. A compliance test cannot possibly avoid very thorough checking of the manuals involved. And thorough checking of accuracy and completeness pays great dividends to the user.

Even catastrophe costs can be reduced. Construction situations are particularly liable to physical damage — and DEC's planning includes in-house support for recovering physically damaged files in as routine a way as possible.

Error corrections are, as yet, untested. But the planning looks good. Both suggestions and errors get automatically logged and, later, reviewed.

(Continued on Page 50)

## READER COMMENTARY/Richard H. Cobb

# Cobol-80 Controversy: Exercise in Futility

The growing controversy over Cobol-80 is most curious. Superficially the issue seems simple. Should Cobol-80 be adopted as an Ansi standard despite the fact that many programs written in Cobol-74 will no longer operate without substantial revision?

It is likely that, at the turn of the century, there was an equally vigorous debate each time a revised standard for buggy whips was proposed. One can assume, however, that not everyone joined in.

Just as, 70 or 80 years ago, certain forward-looking people were moving to horseless carriages and leaving their buggy whips at home, today, forward-looking people see that Cobol, in any guise, will play an increasingly less significant role in their future data processing plans. They see that a nonprocedural language, which lets them simply state what they want without having to specify how to fulfill their requests, can achieve personal and computer productivity increases that are beyond the scope of the most scrupulously enhanced version of Cobol.

Consider the following example. Recently Martin Marietta Data Systems conducted a benchmark for the Department of the Army. A job implemented using the Ramis II nonprocedural language took two person-days

and, when executed, it automatically rejected two incorrect records. It took a whole week to get a parallel Cobol program running, and the Cobol program didn't identify the records. It took an additional five days for it to do that — a total of 10 days.

Two days vs. 10! This means that the nonprocedural language provided a 400% increase in staff productivity, and it did so, as it turns out, using less computer resources. Operating costs per run for the Cobol program were \$120 in batch and \$240 interactively. Ramis II costs for the same job were \$48 in batch and \$96 interactively — and Ramis II costs included a surcharge not levied for Cobol.

The real Cobol question, then, is whether we are addressing the right question. The issue, it seems to me, is not how to enhance Cobol; it is how Cobol applications can be moved to a nonprocedural language in an orderly, evolutionary manner.

The time has come when Cobol should be permitted to fade away. This old soldier has lived a most valuable life and served society well, and the best way to express our gratitude is to allow it a dignified demise.

Cobb is president of Mathematica Products Group in Princeton, N.J.



## READER COMMENTARY/William Pacino

# How to Enter the Magic Kingdom?

When Massachusetts workers pick up a newspaper or magazine or watch television, they hear a loud message: "Get into DP!"

They look at the Sunday newspapers and see page after page of well-paying jobs.

At the same time, trends point to the high-technology and computer industries as important now and becoming even more important in the future. But how does one get into such a desirable field?

According to a survey by the Human Resources Committee of the Massachusetts High Technology Council, member companies projected they

would increase their total work force in Massachusetts by approximately two-thirds during the period from July 1, 1979 through Dec. 31, 1982 — that is, by 53,000 jobs — and they expect to more than double their numbers of technical employees (electrical engineers, computer scientists, technicians, programmers and drafters).

But this sounds like opportunity only for an elite. What door does a college-educated liberal arts graduate with no computer experience knock on to enter this Magic Kingdom?

The problems and obstacles faced by high-technology companies in Massachusetts are as follows (from the High

Technology Council):

"The ability of high-technology companies (in Massachusetts) to actually realize the growth potential anticipated will depend largely on whether there is a sufficient supply of qualified personnel. The extremely tight labor market situation that already exists for high-technology personnel, as reflected in newspaper help wanted ads, is expected to get even tighter. Given this tremendous demand, business, education and government must work together to help develop programs and policies which will increase the available supply of qualified personnel for the high technology industry.

"New college graduates are only one major source of qualified job candidates. Experienced workers from outside the Commonwealth must also be found and recruited. Unfortunately, the tight national market for technical talent plus the high cost of living in Massachusetts are major obstacles to attracting these experienced professionals to the Commonwealth. A growing supply of qualified people must be cultivated to satisfy this strong demand."

Strong demand for technical people could mean opportunity for the Massachusetts resident who already knows how expensive it is to live here and has chosen to stay nevertheless. But what are these glamour companies looking for and how does one build up or acquire the necessary qualifications for these companies?

The council has announced (1) further plans to do what it can to redirect and focus publicly financed education and training programs on high-technology careers, (2) increase retraining opportunities for experienced workers, (3) enhance student awareness of high-technology career opportunities, (4) provide career counseling and professional development programs, (5) develop an ongoing labor market data base, (6) provide incentives to educational institutions to expand their technical programs and (7) encourage companies to support the efforts of educational institutions.

But how much education and/or retraining must a student, graduate or already employed worker keep paying for? Why has the educational system failed us so that bachelors and master's degrees in disciplines other than computer science have so little value?

## Who Will Pay?

The solution the council is seeking — that is, a cooperation between government, business and education — is quite sound and carries an excellent chance of success.

If only the problem of who will pay for the fruits of this cooperation (the industry who needs the skills or the worker who must acquire new skills) could be solved, the high-technology industries would get all the qualified people they need.

It is very frustrating to sit back at a company within Massachusetts not connected to the fast-growing technology field and listen to all the fantastic opportunities and lofty salary stories being bantered about.

It is even more frustrating to be underutilized in your present job but unable to break into a more glamorous one without laying out \$3,300 for programming education or for technical training.

Retraining or building "career bridges" has not quite caught fire with the Massachusetts industries who are constantly searching for people. But for a liberal arts graduate looking through the mesh fence to the green yard of high technology on the other side, such policies, if put into practice, give a great deal of hope that the call "Get into computers!" can be answered by all.

Pacino is a staff member with the Woburn Daily Times, Woburn, Mass.

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READER COMMENTARY/Stanley J. Guzik

# Operations Staffers: The Unsung Heroes

As an avid reader of *Computerworld* for the past seven years, I wonder why more data has not been presented about the operations facet of data processing. From time to time I have seen a line here or a paragraph there mentioning computer operators or supervisors, but nothing in depth.

I would like to see, at least once a month, a section on comments and problems related to the computer room, especially computer operators and supervisors.

I have been an operator and/or a supervisor for 7-1/2 years now and have found very little acknowledgment of the operations department in any publication. This really steams me, for I feel computer operators are as important as programmers, in some ways more. Unfortunately, computer operators and keypunch operators are looked down on by most of data processing, which I think is a grave mistake.

A computer operator is not just a button pusher with a tie on. The operator must be multitasking and multifaceted. First, he must contend with many, many people. He must be able to work directly and very closely with applications and systems programmers, analysts, system design, DP supervisors and DP managers. This in itself is no small task. Because of the great turnover rate in DP, getting adjusted to people and their personalities requires a certain talent.

## Modicum of Intelligence

He must also be intelligent enough to be able to relate technical problems to the programming department and whatever departments he deals with. He must also learn how to communicate about DP and its problems to non-DP people, whether they be users or people within the company.

The computer operator must work with customer and field engineers concerned with the hardware contained in the computer room. He must be observant enough and possess a technical knowledge of the hardware to be able to relate to the engineers the problems or potential problems he might be having with that hardware.

This facet could save many hours and dollars if the operator is able to pinpoint with accuracy the problem exactly for the engineer. The engineer would spend much less time looking and searching for the problem, therefore much less downtime, more production, less overtime for the computer room.

## Multifaceted Training

In most instances the computer operator must be trained and knowledgeable in many areas of DP.

He must know accounting or auditing procedures. Some operators' responsibilities include balancing and checking reports before continuing with processing. He must be familiar with many keypunch machines, which he must use constantly.

He must also know how to fix temporarily, or get around certain problems with machines if they are needed at that time. He must have some knowledge of programming languages at his disposal. I have seen many of the jobs

of the link-and-go variety. I have also seen many compiles fixed late at night over the phone.

The computer operator must know all the little idiosyncracies of each piece of hardware in the computer room. I have seen rubber bands hold machines together until the customer engineer could get there to fix them. The computer operator must also have a certain amount of ingenuity. He must know how to trick the computer into carrying out functions it is not supposed to do or accepting data it is not supposed to accept.

Many times an operator is required to make important decisions on his own

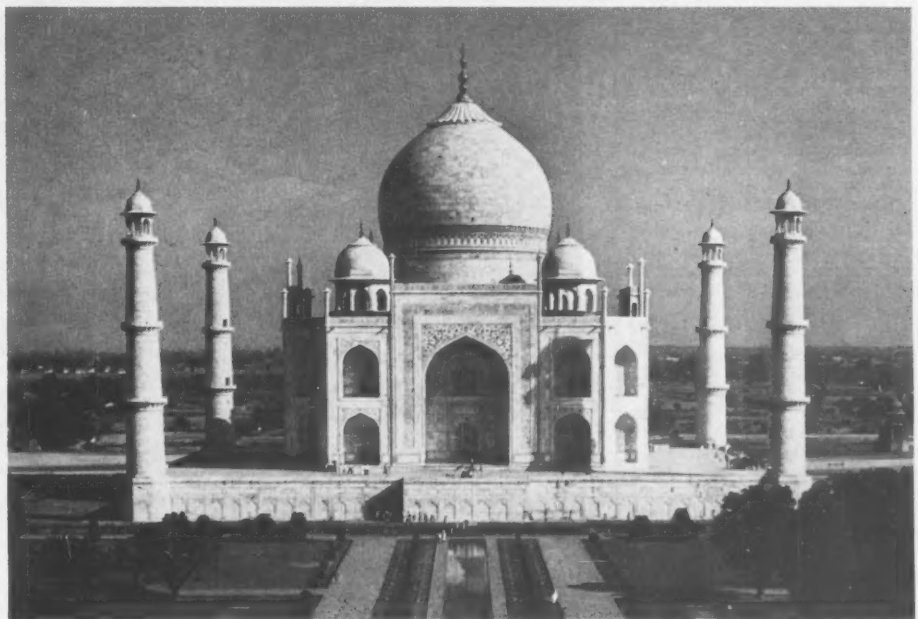
without the aid of a supervisor or a manager. Because of the nature of the industry, operators are on call 24 hours a day, seven days a week. I, as an operator, have worked every holiday in the year at one time or another. I have worked 16 hours straight many times and as much as 26 hours straight when people did not report for work.

You've heard of the saying, "It's lonely at the top"; well, an operator also spends many lonely hours at the bottom if he has to work a second or third shift. Many data centers are locked up after regular working hours and the operator's only contact with the outside world is his radio.

On top of all this, he has to put up with air conditioning which is sometimes to the point of being classified as frigid. He must also endure the endless hum of the machines, which forces him to talk loudly and have bad hearing away from the computer room. And just lately, we are concerned with the emissions of the cathode ray tube and laser printer.

Yes, I do think it is about time some space should be devoted to the operators, supervisors and their world inside the computer room.

Guzik is an operations supervisor in Maple Heights, Ohio.



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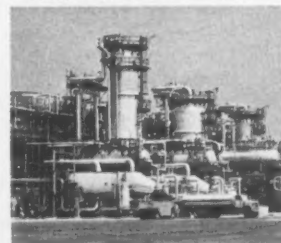
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Interested in more information about Aramco and Saudi Arabia; or in a job with us? Write: Aramco Services Company, Dept. CW0323ML04B, 1100 Milam Building, Houston, Texas 77002.

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## Omission, Distortion

While I applaud *Computerworld's* bringing up the problem of energy for the DP users, the editorial in the Feb. 23 issue omitted an important point and distorted another.

On the rising costs of electrical energy, CW properly pointed out that the total life-cycle costs of energy consumed should be considered when making the selection of DP equipment. What was omitted was any mention of the energy costs for environmental conditioning — air-conditioning. As a rule of thumb, it takes a watt to cool a watt. Therefore, to determine the total energy costs one should multiply the DP energy consumption costs by a factor of two.

On the quality of delivered electrical power, CW was completely wrong in suggesting that the power companies should deliver a grade of service, uninterrupted and voltage regulated, to meet the requirements of DP equipment. The much more economic and sensible approach is for the users of DP equipment to provide themselves with power system buffers which will ensure the delivery to DP of the required quality power.

Fire departments, police, alarm bureaus, hospitals, telephone exchanges and many other power users having special quality requirements have routinely provided on premises storage batteries and/or emergency generators or other means of protecting their service. Important DP installations should do likewise.

V.N. Vaughan Jr.

Chatham, N.J.

## NCC Boycott

I was disgusted to learn that all 2,000 members of the Association for Women in Computing (AWC) and all 1,500 members of Women in Information Processing are going to be running around the National Computer Conference (NCC) in Chicago wearing black armbands to protest the fact that Illinois has not ratified the ERA. I also think it is senseless for these women to believe that Afips is deliberately taking a swipe at women's rights just because Chicago was chosen as this year's site.

There is surely no room for sex discrimination in the DP community. We need all the people we can get of whatever sex. In fact, because of the continued demand for more and more DP personnel, this is the only field where women can SHOW how equal they really are. Twelve years in this field has taught me that the only way to get ahead is to work hard, stay abreast of expanding technology and assume increasing levels of responsibility. My advice to these women is to get the chip off their shoulders and get back

## LETTERS

to work.

The ERA should stand or fall on its own merits, not on the basis of the artificial pressure of boycotts. I do not believe that the status of ERA ratification should have any more consideration in selecting a convention site than whether or not a state has community property or sales tax. But on the other hand, let them wear their black armbands. Nobody will notice them amidst all the other hype and nonsense that goes with NCC.

John R. Crane

Seattle, Wash.

## Wide of the Mark

The editorial "Energy and the User"

[CW, Feb. 23] properly pointed out the importance to DP users of reliable, "good quality" electric power and the significance of its cost.

The editorial also properly called attention to energy efficiency as a consideration in selecting hardware. However, your criticism of the electric utility companies and their regulation was wide of the mark. It is because of the unreliability of supply and increasing cost of fuel oil that the electric utility companies have switched to nuclear and coal plants not only in this country but also abroad.

In most parts of the U.S., nuclear power is the cheapest energy source for electric power generation and is considered by most experts to be one

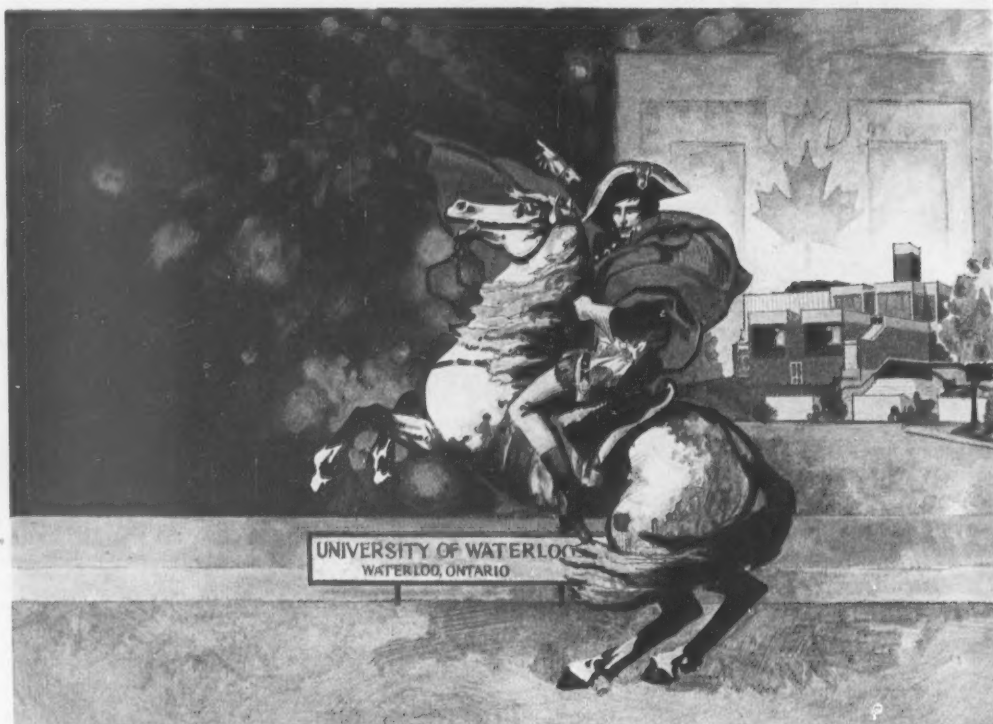
of the cleanest and safest. Three Mile Island, while costly to the utility company, did not produce any injuries or fatalities. The nuclear industry and the utilities are applying lessons learned to the other plants in operation and under construction.

Contrary to the implication in the editorial, the majority of the people understand that all industrial endeavors do have some risk, however small, and that nuclear power has one of the best safety records.

If we are to avoid brownouts and power shortages which in the past have shut down computer systems, we need to establish the proper regulatory climate which will speed up the building and licensing of nuclear plants and help the utilities generate the capital needed to decrease the use of oil and increase power capability.

Sidney Visner

W. Hartford, Conn.



# At Waterloo, Intel's FAST-3805 won.

**The FAST-3805 saves the University of Waterloo thousands of dollars each month while it increases both user and system productivity. Waterloo's Associate Director-Systems, Romney White, explains how . . .**

"Compared to any other DASD, the FAST-3805 in Native Mode\* is the fastest thing going. It has a large enough capacity to satisfy the biggest users around, and it's a cost-effective solution. In other words, the FAST-3805 is really an ideal paging device.

"The FAST-3805 reduces

paging overhead and increases paging capacity. It's an economical solution for extending current CPU resources."

### Increases productivity

"You realize the value of the FAST-3805 when you take it off-line, which we

did accidentally one day. That's when we discovered that our 4341 by itself supported only 25 active users. The FAST-3805 enabled us to double the number of active users on our 4341 at less than half the cost of a new processor. And not only that, those users were more productive because they got more consistent and faster response times.

"We found the FAST-3805 eliminated both the evident

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## Social Wisdom

Hidden away in *Computerworld's* Jan. 26 letters column was more social wisdom than has come from the mouths of the rest of society combined for the last 200 years.

I refer to E.G. Johnston's letter titled "Making Matters Worse," in which he/she/it stated, "In my opinion, if women and blacks and Martians would stop rubbing everyone's nose in the fact that they are those things, people would eventually forget about what they are and concern themselves with who they are. Then the problems would just go away. (P.S. I am one of the above)."

If we are going to clone anyone or anything, let's make it E.G. Johnston. We need millions of them around.

Ken Knipple

Memphis, Tenn.

## Cause and Effect

Rex Malik missed the point ["The Menace of Micros: A Riposte," CW, Feb. 23]. So did David Stevens, for that matter [CW, Nov. 3]. But at least Stevens missed only the effect — not the cause. Malik missed even the cause.

Anyone who took Stevens' article seriously has not long been a student of cultural anthropology, nor has he read McLuhan and Toffler. The fact is that the fabric of Western civilization is changing radically, and the cause is indeed electronic technology, represented by the microprocessor by Stevens. The effect of this change is as yet unknown.

## LETTERS

Western civilization has long been conceived as embracing the train of thought that led up to and included the Industrial Revolution. It led to the printing press, the assembly line, mass production and so on and involved mainly linear thought patterns. Electronic media, on the other hand, force thought patterns that are scattered, branched, nonlinear and random.

Unfortunately for most of us, electronic technology has not been around long enough for us to see its effects with much clarity. We cannot even escape our traditional Western thought patterns when perceiving these effects (Malik especially).

To say that "isolationism is safe" may be true, but man always seeks a

challenge and enjoys a danger. For example, what were we doing on the moon? Certainly not seeking isolation. Nobody conscientiously could refute Stevens' last sentence. However, I would put my money on "better" and retitled the article "Promise of the Micros."

David K. Orndoff

Helena, Mont.

## Book for Sale

Dr. J. Daniel Couger in his article "Couger on Education" [CW, Feb. 23] was kind enough to mention Jim Johnson's book *Managing for Productivity in Data Processing* as an example of the improvement in quality of books on the subject of DP management.

Jim and we are very proud and thought your readership should know that the book is available from QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

Price in the U.S. is \$21.50 plus \$2 for shipping and handling.

Edwin F. Kerr

Executive Vice-President

QED Information Sciences, Inc.  
Wellesley, Mass.

## Subway Advice

I'm going to tell you an experience I had in New York subways which I believe will be very useful to many *Computerworld* readers, specifically those who live in cities with a subway system (perhaps the same would apply to trolley or any kind of electrical transportation).

In 1967 I was working in the financial (Wall St.) area of New York as a programmer/analyst. Our company was using an IBM 1130 computer. I picked up the Sysres-disk at IBM headquarters in midtown Manhattan — after thoroughly testing it on IBM's own installation — and when I arrived at our company and installed the disk, nothing! It wouldn't work.

I went back, now with the DP manager, to IBM. We reloaded the disk, took the subway back to our office, and the same! We were astonished!

Back we went to IBM. Again we reloaded the disk with sysres, but now instead of a subway, we took a taxi. This time everything went OK!

Lesson from this experience: Subways, being electrically motored, created magnetic field forces which, as it is well known, erase electronic storage (disk/tape)! Therefore, never carry your disk/tape files in subways.

Rafael Gonzalez

Teaneck, N.J.

## Survey Time

Recently, in the middle of a normal hectic day for a DP manager, I received one of those calls we all love to receive. The pleasant voice named her firm and wondered if she could take a few minutes of my time for a survey. My on-line system had only been down for a couple of hours so I naturally agreed.

Her first question was, "What is your opinion of computer output microfiche and microfilm?" Trying to put the nice lady at ease, I replied, "I think it's blown all out of proportion."

Can you imagine my surprise when she said "thank you" and immediately hung up.

Russ Wineland

Las Vegas, Nev.



time. But since all CPUs don't wait at the same price, a user who has a 3033 with a 15 percent page wait could save \$15,000 to \$20,000 a month with the FAST-3805.

"Not only did the FAST-3805 take the place of two 2305s and a 2835 controller at Waterloo, but it helped us avoid the purchase of another 2835/2305 system. With the FAST-3805's increased capacity, we were able to stay within our budget . . . and still meet the increased needs of our users.

"In summary, Waterloo got more capacity, better performance and better reliability for less money with Intel's FAST-3805 semiconductor disk."

If you are interested in learning how the FAST-3805 can unleash your system resources and increase your personnel and system productivity, contact Intel's Marketing Information Office at 512/258-5171 or clip and mail the coupon below.

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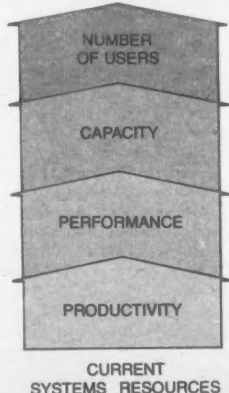
\*Native Mode and 2305-emulation are two personalities of the FAST-3805 currently available.

troller and channel contention. The result was more users who are more satisfied. And that's our objective as a data processing organization."

## Fast paging saves dollars

"On our 3031—which was overloaded, supporting 160 users—we had a page wait of about three percent with two 2305s. However, when we switched to a FAST-3805, the page wait went to zero. The FAST-3805 was able to bring in pages about two and a half times faster than the 2305s. In our situation, switching to the FAST-3805 saved us a couple of thousand dollars a month in system and people

page wait and the page wait that masquerades as I/O wait. And by reducing the paging load, the FAST-3805 reduced the device, con-



## Urge to Write?

The In Depth article "Writing Your First Book: A Primer for DP Professionals" [CW, Feb. 23] must have been directed at the DP professional of the 1950s.

The advent of computer typesetting makes it practical for an author to typeset his own book and eliminate the need for the "funny little marks" to which the primer alluded. Douglas R. Hofstadter's recent Pulitzer Prize winning *Godel, Escher, Bach* is an example of an 800-page book typeset by the author.

Computer typesetting is very attractive for tabular material already in machine-readable form, as it eliminates proofreading, but it is also a useful option for anyone with a CRT who feels the urge to publish.

Joel Chinkes

Atlanta, Ga.

## LETTERS

### Didn't Deliver

I was extremely disturbed after reading the Feb. 9 article "Comparing the IBM 4341 and Magnuson M80/42." I do realize that this article was written by someone other than the *Computerworld* staff. However, I feel the article misrepresented the facts.

This opinion is based on my own analysis of plug-compatible manufacturer (PCM) equipment performed approximately six months ago for my company, which was in the market for an "IBM 4341 plug-compatible mainframe." Our needs called for the installation of a system with a 1 Mips speed range processor and compatible to IBM's 4341. At the time of our eval-

uation, Magnuson by its own admission did not have nor could it deliver an M80/42 processor. Several Magnuson users contacted were also awaiting the M80/42 upgrade.

In the article, the author clearly implies that the Magnuson M80/42 has been installed with some users for over a year. I believe this to be a misrepresentation and false, and feel that CW has supported an injustice not only to companies such as IBM and IPL Systems, but also its readers.

Thomas J. Price

Los Angeles, Calif.

### Point for Unions

In "Alternative to Unions" [CW,

Feb. 2], Ulo Reivik suggests "Performance as an alternative to unionizing."

I agree performance should be the key to protecting one's job; however, the original letter submitted by Henry J. Noble, "A Case for Unionization" [CW, Jan. 12], specifies fair treatment, unreasonable exploitation and a professional environment.

No matter how well one performs, it doesn't promise a fair deal. That is the point!

Robb Puller

Ardmore, Pa.

### Less, Not More

The editorial "Energy and the User" [CW, Feb. 23] is slanted and inaccurate.

First, truly critical automatic data processing is isolated from the beleaguered public utility. Other non-critical ADP has various devices to supply instantaneous backup power should public power fail. ADPer, not utilities, are ultimately responsible for power supplies compatible with their needs.

Second, ADP evolution has greatly decreased ADP energy consumption. In terms of operations per watt, ADP has never been cheaper. Furthermore, as power dissipation has decreased over the years, space and air conditioning energy requirements also have decreased greatly. These trends will continue, especially as energy costs rise.

Third, editorial statements about the death of nuclear power are premature. During 1980, four nukes came on-line. The 75 licensed nukes generated 260 billion kilowatt-hours worth \$15.6 billion at present rates.

Let's be realistic. In constant dollars, the cost of kilowatt-hour today equals that of 1965. Because machine operations per watt have increased dramatically in the interim, energy costs per computing watt are even less now than then. Furthermore, excessive misregulation created this energy scapegoat. Lets have less — not more.

Frederick C. Harwood

Great Barrington, Mass.

## DEC, Tester Offer Benefits

(Continued from Page 45)

Correction procedures include pre-publication checking by Peat, Marwick of the method for applying the corrections, as well as the correction approval procedures that have to be followed before the correction is submitted for publication.

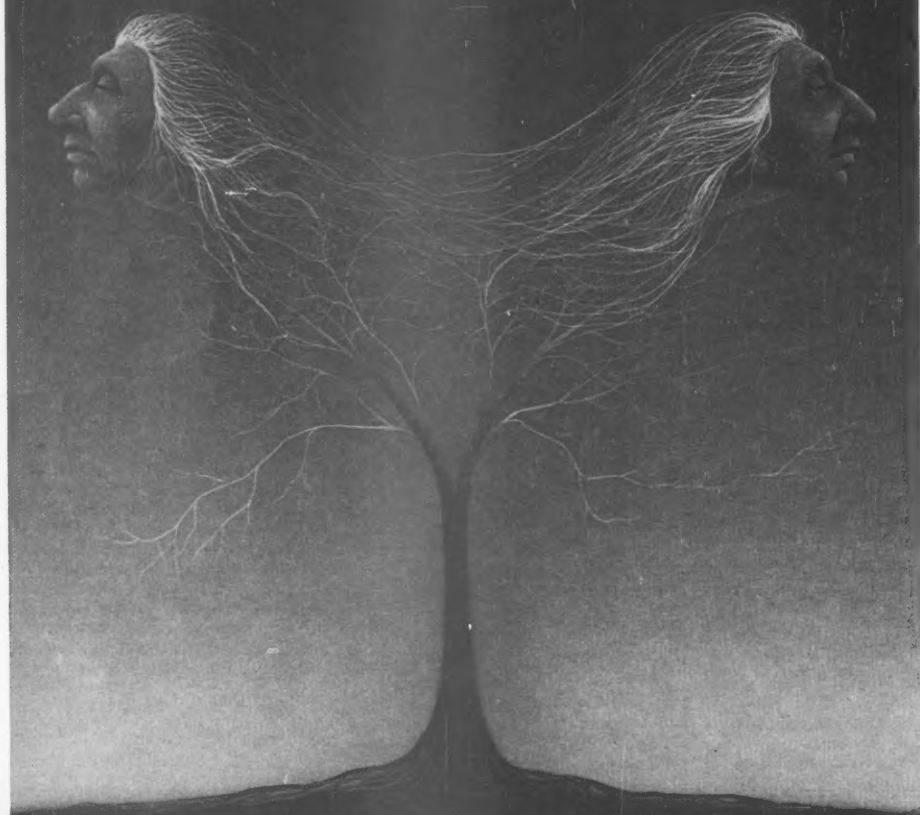
Not all the answers are available yet. For instance, will compliance-tested software give a user long software life? Upward compatibility with new versions?

These, of course, are the \$64 questions that people who have put their trust in Cobol are now beginning to ask. The situation currently is fuzzy.

Still, users can already see very real virtues in compliance testing. Moreover, there simply isn't any alternative that even attempts to match the minimum abilities of this new type of software. That, probably, is the biggest reason users should know about it.

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Poster reproduction of this Frank Rowell painting available upon request.

## Package Runs Risk Analysis For OS Data Centers

OAK BROOK, Ill. — A risk analysis system which reportedly will remove some of the guesswork involved in managing protection and security in the IBM OS data center has been developed by Pansophic Systems, Inc.

Panrisk can be used to create and maintain an analytic framework for data collection, allowing users to generate estimates of physical damage and delayed processing losses, a spokesman said.

Automated features of Panrisk enable the analyst to input information about computer resources, threat probabilities, vulnerabilities and loss potentials; Panrisk then performs all comparative calculations deemed critical, projects total expected loss, forms a composite and generates reports that highlight major risk exposures.

For example, a Damage Evaluator report focuses on physical damage from natural and other events. A Risk Evaluator report costs out application delays due to consequences of

physical damage.

According to Pansophic, any action plan can be cost justified before it is undertaken because Panrisk also calculates the cost of solutions.

Panrisk aids the analyst by making it feasible to generate a full-scale estimate of expected loss without the burden of manual calculations, the vendor said. This can reportedly be done in even the most complex environments.

Critical threats, such as physical damage, fraud or unauthorized disclosure of sensitive data, can be quickly identified. An initial risk analysis with Panrisk can be performed in as little as two weeks, the vendor claimed.

Panrisk is a fully documented system which requires no extensive training, according to Pansophic.

Perpetual license of the product is available at a cost of \$15,000 or through various long-term lease plans. Pansophic is located at 709 Enterprise Drive, Oak Brook, Ill. 60521.

## 'Adabas' DBMS Fitted To VAX-Based Systems

RESTON, Va. — Software AG of North America, Inc. has announced a version of its Adabas-M dictionary-driven data base management system (DBMS) for Digital Equipment Corp. VAX-11/750 and VAX-11/780 minicomputers.

The Adabas-M DBMS operates on VAX machines running under VMS and allows users to interact with the data base in any of three ways: via user-written application programs written in native and compatibility-mode VAX languages, from terminals via the DBMS' Adascript-M query and report facility or through interactive data base administrator utilities, a spokesman said.

Adabas-M is the firm's first data base entry for the VAX machines, although it does offer an Adabas-M package for DEC PDP-11 computers running under the RSX-11M, RSX-11M-Plus and IAS operating systems. Complete transparency of migration to Adabas-M under VMS is available for PDP-11 users, the spokesman noted.

Software AG's system competes with DBMS packages such

as Cincom Systems, Inc.'s Total, which is currently available for VAX computers. However, the Adabas-M package differs from Total in that it is a value-based rather than pointer-based DBMS, the spokesman explained.

Total relies on informational pointers embedded in the DBMS records to provide navigation, while Adabas-M is much less procedural and more "relational," he said.

### Relational DBMS

The Software AG spokesman declined, however, to identify Adabas-M as a strict relational DBMS, a concept which he termed "a sacred cow" whose definition varies from vendor-to-vendor without any degree of standardization.

But, "if someone wants to call it relational because they're in love with high-tech, that's OK," he stated.

Adabas-M also differs from Total-like packages in that it is the only multithreaded DBMS for VAX computers and incorporates such features as a full dictionary, full utilities, a report writer, and a fully developed query facility, the spokesman claimed.

Finally, with an eye toward data integrity, the Adabas-M software includes: automatic restart after system software or hardware failure, record-level lockout to avoid interlock in competitive update environments, and a logging of data base update transactions to a recycling disk journal.

Available on a CPU license basis, the Software AG VAX DBMS costs \$40,000, acquired on a monthly rental basis, or leased on a two-, three-, four- or five-year plan. Installation, training and one set of the documentation is included in the cost of the system.

Software AG is located at 11800 Sunrise Valley Drive, Reston, Va. 22091.

## 'Roscoe' Update Changes AWS

PRINCETON, N.J. — Version 5 of Roscoe, Applied Data Research, Inc.'s (ADR) on-line programming system, includes significant internal and external changes to the Active Work Space (AWS) and libraries, according to its vendor.

The update offers 18 additional terminal commands and includes an on-line Help facility. The new version also features an enhanced user interface and a new internal structure.

The user interface includes new documentation, including a complete restructuring of user-level documentation, and new screen handling, which features a command input and execution area

with a system information line and forward and backward scrolling under PF key control.

It also includes Roscoe Programming Facility (RPF), a high-level structured command language for writing interactive procedures. However, the Rospro facility continues to be supported.

Roscoe Printing Services, a subsystem for scheduling, monitoring, routing and canceling data destined for the 3280 series of printers, also is included.

The new internal structure for Version 5 provides new dispatching and screen-handling logic and interfaces to the terminal, library and AWS. Its reentrant

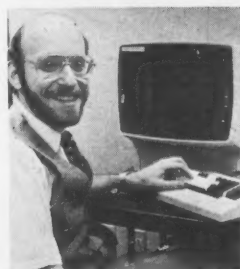
code is new and the dispatching path length has been reduced. There also is multiprogramming level control and load module repackaging.

Secret interfaces have been eliminated, stack architecture is being used for temporary storage and OS Save area conventions are observed by Version 5. It also features module ID character strings, recording of services and a problem determination guide.

The permanent license price for Roscoe begins at \$34,000. Monthly, three-year and five-year leases also are available. ADR is located at Rt. 206 and Orchard Road, CN-8, Princeton, N.J. 08540.

Attention: IBM DOS/VS/E Users

## DOSSIER IMPROVES DOCUMENTATION AND STANDARDS



Here's what Richard Amster, Systems Programmer, Precision Castparts Corp., says about DOSSIER:

"It's just a tremendous tool. We use DOSSIER on our IBM 4341 to tell us all we need to know about file and program usage. Our programmers and analysts use DOSSIER constantly, day in and day out.

"I don't think there's a product to compare with DOSSIER. The Called Program Analysis facility

reads the object code in a program to find out whether another program uses it, rather than just looking at names. And this is really a very sophisticated thing to do.

"DOSSIER's given us a degree of control over documentation and standards we couldn't have achieved without many months of work.

"Frankly, I don't think we're using half of DOSSIER's capabilities, simply because we haven't had time yet. But I'm sure we will in the future. In fact, we're just starting to



implement the DOSSIER Library Audit, which looks like it's worth the package price alone."

Richard Amster is not alone in his enthusiasm for DOSSIER. More than 650 customers currently use DOSSIER to clean up, maintain, and audit DOS, DOS/VS and DOS/VSE libraries. DOSSIER is also invaluable for conversions.

Try DOSSIER free, without obligation, for 30 days. For more information, just clip this coupon and mail to Computer Concepts, Inc., 6443 S.W. Beaverton Highway, Portland, Oregon 97221. Or call 503/297-4741.

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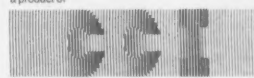
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## Cobol Course Fits Beginners

MORRISTOWN, N.J. — A 35-day training course designed to develop entry-level Cobol programmers is being offered by Boeing Computer Services.

The Hands-On Entry Level Programmer (Help) was designed for people with little or no DP experience. It will be offered April 6 and Sept. 14 in San Francisco, April 27 in Los Angeles and Chicago and Oct. 5 in Chicago.

The course includes modules covering introductory DP and programming concepts, Cobol language, JCL and a Cobol workshop.

The price for the course is \$5,500 per student. The vendor can be reached through P.O. Box 24346, Seattle, Wash. 98124.

## Debit Card Manager Fits OS, DOS

FUQUAY-VARINA, N.C. — An on-line debit card management system that reportedly enables banks to eliminate the necessity of going subhost during batch updating of ATM balance files is available from Software Development and Maintenance, Inc.

OCM24 was designed to operate on IBM OS or DOS operating systems and interface with existing ATM host software. It has been extended to provide all software necessary for customer solicitation, card issue and ATM data base management, the vendor spokesman claimed.

The product is a combination of batch and on-line CICS/Command Level transactions, a spokesman said, adding batch programs are written in ANS Cobol and the CICS transactions are written in reentrant Assembly lan-

guage code.

All data files are Vsam.

The system is priced from \$25,000 to \$35,000, depending on desired fea-

tures, the vendor said.

The firm may be reached through P.O. Box 668, Fuquay-Varina, N.C. 27526.

## Applications Package, Course Offered for System/34, JAS/34

PHOENIX — Computer Guidance Corp. is offering an applications package for IBM System/34 users and an implementation course for JAS/34 users.

The System/34 Data Base Programming System assists users in reducing the cost in developing and maintaining their applications packages by allowing them to code and maintain external data file specification, automate pro-

gram documentation and generate RPGII file maintenance and inquiry programs.

The use of external file specifications makes data independent from programs reducing the time required to code, test and maintain them. The Record Layout function calculates the From/To position of each field and removes all hard-coded file specifications and replaces them with copy statements, according to the firm. The Documentation Function produces key reports in 80-column format to help reduce the time required to maintain programs, the firm said.

The one-day course is given at any location where a customer has access to a System/34.

The System/34 data base programming system costs \$1,600 and the course fee is \$750. Computer Guidance Corp. is located at 2301 E. Shea Blvd., Phoenix, Ariz. 85028.

## Maintenance Report Offered by Educo

ARVADA, Colo. — A *Software Maintenance Newsletter* designed to act as a focal point for the collection and distribution of knowledge about maintenance is being launched by Educo Corp. A free first issue is available on request.

The newsletter aims to contain a variety of articles on the latest state of the art, modification tools and techniques in a bid to constantly update the reader to existing solutions for his or her problem.

The newsletter, to be published quarterly, is available on a year's subscription for \$20 from Suite 102, 6777 Wadsworth, Arvada, Colo. 80003.

## Nursing Home System Holds Five Subsystems

COLUMBIA, S.C. — An integrated nursing home system with five subsystems is available from Computer Systems Architects, Inc.

The five subsystems are financial, administrative, patient care, diet planning and billing. An automated pharmacy system is optional.

The system is written in Cobol and runs on Texas Instruments, Inc. models 990/4 and above. A total turn-key system starts at \$50,000, the vendor said from Suite 401, 1136 Washington St., Columbia, S.C.

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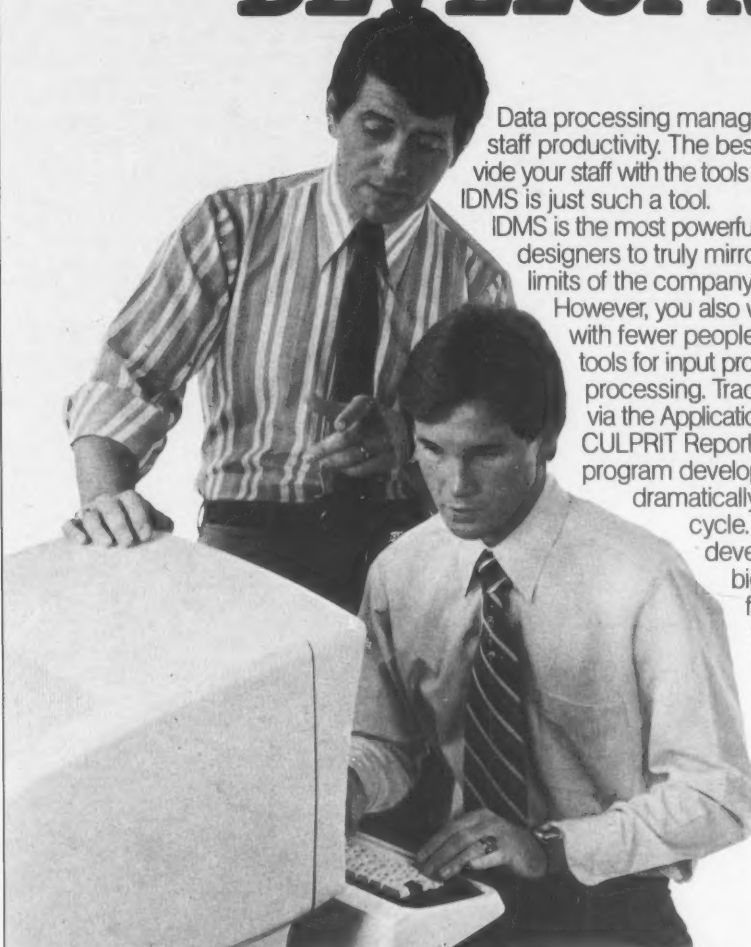
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## Restrict Access Featured Manufacturing Packages Aimed at PDP-11

GLENDAL, Calif. — Mini-Computer Business Applications, Inc. (MCBA) has released the first five packages of its Manufacturing System in Dibol for Digital Equipment Corp. PDP-11 systems.

MCBA's Manufacturing System is an integrated set of 16 modular, on-line and interactive packages that provide up to 200 passwords, which allow the

## Monitor Runs Under RSX-11M

RIVERDALE, Md. — Gejak, Inc. has now made its performance monitor available for both the Digital Equipment Corp. RSX-11M-Plus and RSX-11M operating systems.

The SRF System Reporting Facility monitors task activity, pinpoints system bottlenecks and identifies critical resources for replacement or upgrade, according to the firm.

SRF measures capacity to show how much computer power is available to handle current and future work loads. Percentages for CPU utilization are logged at user-defined intervals that can range from one to 60 minutes, the vendor explained.

One-time license fees are \$2,995 for RSX-11M and \$3,495 for M-Plus. One-year warranty, maintenance support and documentation are included from Gejak, which can be reached through P.O. Box 188, Riverdale, Md. 20840.

## DEC DMS500 Gets Sort Utility

LOS ALAMITOS, Calif. — A sort utility for users of Digital Equipment Corp.'s DMS500 records management software has been announced by Software Techniques, Inc.

According to the vendor, DMS500 is almost twice as fast as other available sorting techniques and has a powerful sort capability that handles an unlimited number of keys in any mix of ascending/descending or string/numeric data types without hurting performance.

Designed for compatibility with the RSTS/E Basic-Plus operating system, DMS500 supports the standard Basic-Plus data types and is available for \$650 from Software Techniques, Suite 101, 5242 Katella Ave., Los Alamitos, Calif. 90720.

## DEC Users Gain Insulation Analysis

COLUMBUS, Ohio — G.K. Enterprises, Inc. has announced a computerized insulation analysis package and an oil and gas financial accounting package for Digital Equipment Corp. hardware.

The insulation analysis package can be used under DEC's RT-11 and TSX operating systems and costs \$1,500, the firm said.

The oil and gas accounting package costs \$2,500.

G.K. Enterprises can be reached through P.O. Box 264, Worthington, Ohio 43085.

user to restrict access at the file level as well as the application level. The system also features multicompany capability, supporting up to eight companies.

### Inventory Management

MCBA's Inventory Management package features multilocation capability, forecasting, cycle counting, tag control for physical inventory and can function as a stand-alone package or can be interfaced with other manufacturing packages. The Bill of Material Processor (Bomp) is multilevel and provides a full set of single-level, indented and summarized inquiries and reports.

The firm's Customer Order Process-

ing package provides two-pass customer order entry and editing and the General Ledger package provides user-defined accounting periods, transaction date sensitivity, adjustments to prior periods and future periods with capability to generate user-formatted financial statements for any period. The Accounts Receivable package provides tracking of both open-item and balanced-forward customers.

The Customer Order Processing, Inventory Management and Bomp packages are licensed at \$2,000 each for single use.

Accounts Receivable and General Ledger are \$1,500 each for single use from MCBA at 117-119 S. Brand Blvd., Glendale, Calif. 91204.

## Link Updated For 'Datamacs'

VALLEY FORGE, Pa. — An enhanced version of the IDD/IDMS interface for Datamacs has been announced by Management and Computer Services, Inc.

The automatic test data generator allows users of Cullinane Corp.'s IDMS data base management system to modify, unload or reload existing data bases. It also provides archival storage and allows Cullinane Corp. IDMS users to utilize selective extractions of files rather than live data bases.

The package costs \$19,000. The vendor is located at 74 Great Valley Corporate Center, Valley Forge, Pa. 19482.

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sary twisting and turning. A 12" or 15" screen (30.5-38.1 cm.) that eliminates hunching and bunching. And a non-glare screen with optional tilt that eliminates squinting and squirming. And as a special added feature, you'll find visual attributes with complete editing to highlight and format the display. Plus, two pages of memory that allow you to enter

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Intermediate Terminal is a trademark of Lear Siegler.



## 'SDM/70' Updated

PHILADELPHIA — Atlantic Software, Inc. has announced an enhanced version of its System Development Methodology/70 (SDM/70).

Enhancements include improved communication between the data base analyst and the systems designers, more efficient use of data base manpower and smoother transitions from testing to implementation, the vendor spokesman said.

SDM/70 Version II costs \$32,500 from the vendor at 320 Walnut St., Philadelphia, Pa. 19106.

## Boeing's 'Eisquire' Ties 'EIS' and 'Inquire'

MORRISTOWN, N.J. — Eisquire, a service offering from Boeing Computer Services Co. (BCS) links EIS, the company's financial planning system that stores, analyzes and forecasts summary data, and Inquire, its data base management system that stores and analyzes large volumes of detailed data.

Eisquire reportedly gives management full control over both levels of data and provides the analytical tools required for decision making. With Eisquire, a user can store

detailed business and financial data in Inquire and then automatically transfer selected data into EIS, the firm said.

### Typical Applications

According to BCS, Eisquire is suited to the fields of finance, sales, marketing and personnel. Typical applications might be cost analysis, bid development, operations planning and competitive position forecasting.

Eisquire is available on a time-sharing basis from BCS and is priced at machine rates, the vendor said from 7980 Gallows Court, Vienna, Va. 22180.

## 'Risktrac' Fits Insurers

LEXINGTON, Mass. — TMI Systems Corp. has unveiled an automated information system designed to track insurance coverage and related risk management activities.

Risktrac provides instant access via video screens to current and historical data. Information can be entered, sorted, analyzed and reported on line, the vendor claimed.

The package consists of four modules, which are available individually or in a complete system: insurance policies, coverages at each company location, all claims and billings to subsidiaries.

The base model of the system is claims processing; it costs \$25,000. The other modules are \$10,000 each, the vendor said from 83 Hartwell Ave., Lexington, Mass. 02173.

## Office Manager Aids Doctors

MINNEAPOLIS — A medical office management system that reportedly gives the CPT 8000 word processor the ability to handle a variety of data and text processing functions for medical offices is available from CPT Corp.

The software maintains a balance-forward type of accounting on all charges and payments, zeroing out detail at the end of the month and placing the balances in the appropriate 30-, 60-, 90- and 120-day categories, the vendor said.

There is also a separate file for all charges and payments which is cross-indexed by patient, doctor, insurance code and diagnosis code, the company said.

Suggested price for the Medical Office Management System with interface is \$2,500 and is available from CPT Corp., P.O. Box 295, 8100 Mitchell Road, Minneapolis, Minn. 55440.

## DTSS Adds Tymnet Access

HANOVER, N.H. — DTSS, Inc. has added Tymnet network access in addition to its Telenet, Datapac and direct-dial facilities.

Tymnet offers DTSS users an international X.25 network that is fully compatible with all standard terminals operating at 30- or 120 char/sec. Access to Tymnet is available though a local phone call to any of 500 minicomputer nodes in nearly 250 cities around the world, according to DTSS.

The Tymnet communications facility typically costs about \$5/hour, according to the vendor, which is located at 10 Allen St., Hanover, N.H. 03755.

## 'Onsite' Service Offered On Partial-System Basis

ANN ARBOR, Mich. — ADP Network Services is making its Onsite leasing service available to customers on a partial-systems basis, which it claims will fill the requirements of occasional clients at a much lower monthly cost.

Under the new partial-system approach, clients may elect to use 25%, 50% or 75%

of the full ADP/Onsite package for a typical price of \$6,500/mo, compared with the \$10,000 minimum charge for the full system.

Each 25% increment reportedly includes resources for up to five simultaneous users. The bureau is at 175 Jackson Plaza, Ann Arbor, Mich. 48106.

## 'LMS' Update Adds Codes

NEW YORK — Remote Computing Corp. has enhanced its Liquidity Management System (LMS) for portfolio management by adding transaction codes that reportedly allow more transactions to be processed in a "single"

run of LMS.

LMS costs between \$250 and over \$1,000 monthly, depending on lease arrangement and amount of data in the portfolio, the firm said from 1076 E. Meadow Circle, Palo Alto, Calif. 94303.

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## 'Foresight' Enhanced

PITTSBURGH, Pa. — On-Line Systems, Inc. said it has enhanced Foresight, its financial modeling system, to allow for greater manipulation of data, while eliminating organization, sorting and structuring requirements.

Foresight 6.2 will now feature three new commands: SORT, RESEQUENCE and SHIFT.

The command enhancements will be available to Foresight users at no additional costs from On-Line Systems at 115 Evergreen Heights Drive, Pittsburgh, Pa. 15229.

## Wang Users Get Indexing System

McLEAN, Va. — A document indexing and retrieval system intended for use by government agencies, law firms, associations and other organizations requiring rapid cataloging facilities is available from Lupfer & Long, Inc. for the Wang Laboratories, Inc. V5 minicomputer.

Texttract, written in Cobol, was designed to be installed on any Wang V5.

A perpetual license to Texttract is available for \$10,000 from Lupfer & Long, 8200 Greensboro Drive, McLean, Va. 22102.

## Plotter Designed For DG Printer

COLUMBIA, Md. — A new software plotting package for use on the Data General Co. LP2 printer using Calcomp-compatible, Fortran-callable subroutines is now available from Rhintek, Inc.

The package, written in American National Standards Institute (Ansi) Fortran IV, was designed to allow fast and cost-effective production of graphic output, Rhintek said.

The price of the package is \$950 from Rhintek, Inc., P.O. Box 220, Columbia, Md. 21045.

## Management System Runs On 5110, 5120

ATLANTA — Computer-Ease, Inc. has unveiled a route management software system that runs on IBM 5110 or 5120 computers.

The product provides product inventory in warehouse, machines, trucks; daily route sheets; printing of data entry audit trail; commission statements and ledger; location, product and route profitability.

The product licenses for \$9,995, the vendor said from Suite 222, 5725 Buford Highway, Atlanta, Ga. 30340.

## Data 3 Release Gives Business Forecasts

SANTA ROSA, Calif. — Data 3 Systems, Inc. has announced Release 2 of the MRPS 34-M master planning system, which now contains a business forecast that has both sales and production forecasts, the vendor said.

The MRPS 34-M Master Planning System, including source code and documentation, is priced at \$30,000 from Data 3 Systems, Inc., P.O. Box 441 Santa Rosa, Calif. 95402.

# Schedule System Aids Doctors, Dentists

LOS ANGELES — An automated scheduling system for medical and dental groups and clinics, Qtime, is available as a software package for Datapoint Corp. computers or as a turn-key system from Data Care Systems, Inc.

Qtime operates on Datapoint 1800 or larger system or in a time-sharing environment under Datapoint. It also operates in conjunction with the Patient Billing and Accounts Receivable System also provided by Data Care.

### Doctor Appointments

Each doctor's availability for appointments is visually displayed on the CRT terminal, and patients may be scheduled into any time period for any day.

Qtime also provides operational ben-

efits: A patient can be cross-referenced by chart and by name.

Qtime is written in Datapoint Databus. Source programs and documentation set is provided to the user. The software costs \$3,000 and an entire Pbar/Qtime Datapoint system with a

128 CPU, CRT terminal, 160 char./sec printer, 10M-byte removable disk and software costs \$32,800.

Data Care Systems is headquartered at 2044 Armacost Ave., Los Angeles, Calif. 90025.

## PBCS Offers Accounting Module

SCOTTSDALE, Ariz. — A distributor and manufacturer module designed to handle inventory, on-line order entry, invoicing and accounts receivable has been added to the line of real-time business applications packages of Professional Business Computer Systems, Inc. (PBCS).

The module is also said to handle sales analysis for distributors and manufacturers.

Company packages run on Texas Instruments, Inc. DS990 Model 4 and up.

The module is priced from \$12,000 to \$26,000, depending on security level and number of companies served, and includes inventory, order entry and invoicing.

Professional Computer Business Services is located at 10215 N. Scottsdale Road, Scottsdale, Ariz. 85253.



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- ☐ Insurance Services
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- ☐ Real Estate Services
- ☐ Communications
- ☐ Business Services
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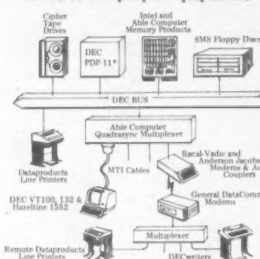
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\*DEC & PDP-11 are registered trademarks of Digital Equipment Corporation.

## Package Combines WP With HP 250's 'Image'

BELAIR, Md. — A word processing (WP) and data management package for the Hewlett-Packard Co. 250 small business computer has been introduced by Maryland Computer Services, Inc.

Correspondence Processing (CP) 250 combines word processing features with the HP 250's data base management system, Image. It enables the operator to add, edit, modify and store text.

CP 250 also interacts with information stored for other HP 250 applications. For example, using CP 250 with an accounts receivable package, the operator can produce credit letters to all customers who owe more than \$500 for 60 days or more, the vendor said.

The CP 250 package costs \$2,500. OEM arrangements are available and a demonstration disk can be purchased for \$100, the vendor said from 502 Rock Spring Ave., Belair, Md. 21014.

## Graphs Routine Joins DI-3000

BOULDER, Colo. — The release and first installations of DI-3000 Charts & Graphs, a business graphics subroutine package built upon the vendor's DI-3000 Core-based graphics system, is being offered by Precision Visuals, Inc.

Like the underlying DI-3000 system, Charts & Graphs is both machine-independent and device-independent.

The Charts & Graphs system offers a comprehensive set of tools for building publication-quality line graphs, pie charts, and bar graphs, the vendor said. The system supports chart creation using intelligent defaults and explicit definition of output appearance.

The package is available for use with most of the major vendor's equipment, according to the firm. A perpetual license for Charts & Graphs is \$4,000 on top of DI-3000 and includes one-year maintenance and updates. The vendor is located at Suite 303, 250 Arapahoe Ave., Boulder, Colo. 80302.

## Three Tools Fit Pascal Tasks

SANTA BARBARA, Calif. — Health Data Products, Inc. has announced three software tools for Pascal programmers:

- Screen Handlers, which is compatible with a variety of terminals, is intended to improve CRT data input by providing extensive error checking and a system for storing and changing user prompts without reprogramming.

- Output Formatter includes a tab function, automatic page and line counter during program execution and top-of-form routine.

- Forms Generator includes the Output Formatter and additional software which enables an end user to redesign reports without programming.

Source code for the Pascal software tools is available on Apple Computer, Inc. or 8-in. diskettes, in either UCSD Pascal or Pascal/M. Screen Handler costs \$75; Output Formatter is available for \$37.50; and the price for Forms Generator is \$49.50 from Health Data Products, 222 E. Anapamu St., Santa Barbara, Calif. 93101.

## Newsletter Looks At Development

PHOENIX — A monthly newsletter entitled "System Development" focusing on in-house development, such as design, programming, integration and maintenance activities, is being launched by Applied Computer Research.

Designed to cover a wide range of topics including improved programming techniques, software engineering, application development aids and project management, the newsletter will address what Editor Phil Howard describes as "a productivity crisis in DP system development."

"System Development," priced at \$75, is available from Applied Computer Research, P.O. Box 9280, Phoenix, Ariz. 85068.

## ACM-Sigmod 1981 Slated for April 29

ANN ARBOR, Mich. — The Association for Computing Machinery (ACM) is to hold the ACM-Sigmod 1981 International Conference on Management of Data at the Graduate School of Business Administration, University of Michigan, from April 29 to May 1.

Topics under discussion include physical storage structures, data base management problems in very large-scale integration, transaction management and data dependency theory.

To register for the conference write to Carol J. Dunn, ACM-Sigmod 1981 Conference Registration, Graduate School of Business Administration, University of Michigan, Ann Arbor, Mich. 48109.

## Infoterm Book Gives Data Bank Terminology

DETROIT — Terminological Data Banks was compiled by Unesco's International Centre for Terminology (Infoterm) to help coordinate the standardization of terminology used in data banks worldwide.

The softcover volume contains the proceedings of the First International Conference on terminology data banks convened by Infoterm in Vienna in 1979. The book costs \$45 and is distributed by Gale Research Co., Book Tower, Detroit, Mich. 48226.

## Account System Made For Grain Elevator Use

GRAND RAPIDS, Mich. — An accounting system specially designed for grain elevators and incorporating automatic calculation of dollar amounts for percentages of moisture, weight, foreign material and damage is available from Cascade Data Inc.

The system, with a typical configuration of 2.4 million characters of diskette storage and 64K characters of memory, costs \$12,500.

Cascade Data is at 6300-28th St., S.E. Grand Rapids, Mich. 49506.

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# Based on 'Cambridge Ring' Local Net System Out to Rival Ethernet

By Brad Schultz  
CW Staff

LONDON — Logica VTS Ltd. here aims to spoil the Ethernet craze with a local networking system based on the "Cambridge Ring," which grants transmission privileges differently than Ethernet and other carrier-sense multiple access (CSMA) architectures.

Users of the Logica VTS Polynet — now available in the U.S. — regularly get an opportunity to bid for permission to transmit through the local network, but the opportunity reaches one user at a time.

CSMA systems, on the other hand, allow a user to transmit when it seems unlikely that another user has the same idea. The system reckons the chances of two transmissions colliding by sampling the lines and, according to an algorithm, figuring when the lines will probably be clear.

The Cambridge Ring approach was developed at Cambridge

University during the past five years. The Institute of Electrical and Electronics Engineers (IEEE) has debated whether that approach, sometimes called token passing, is superior to CSMA. Recently, the IEEE decided both approaches are adequate [CW, Dec. 22].

Logica VTS reportedly visited Cambridge, liked what it saw under development at the Computing Laboratory, and made that implementation the basis of a system for its own offices.

The UK's Science Research Council has ordered 10 Polynets for computer science departments in British universities. Logica VTS stated, calling this the largest order for local-net systems yet placed in Europe.

## Supports Larger Net

American users now have Polynet and Ethernet systems to consider in arranging data communications within a building or a cluster of adjacent buildings. Po-

lynets is easier to install, Logica VTS said, and will support a larger network, while allowing system faults to be located more easily.

Both Polynet and Ethernet run at 10M bit/sec, but Polynet employs twisted-pair cabling, which Logica VTS said is less expensive than the coaxial cabling Ethernet and other local net systems require.

With Polynet, a small number of "slots" circulate continuously through the network. Any station wishing to transmit inserts a "mini-packet" of data into the next available slot, marks the slot "full," and addresses it to the destination station.

If free to do so, the destination station copies the data it receives and marks the mini-packet "accepted." The mini-packet then travels back to the transmitting station, which notes that its message was accepted and marks the mini-packet "empty."

According to Logica VTS,

Polynet's low-level protocol "provides a very simple, efficient form of flow control and prevents any one station from 'hogging' the network's bandwidth."

Among the system components, the Network Node was said to perform a repeater function and control the insertion and reception of mini-packets. It costs \$1,600. Each system can have up to 254 Network Nodes, spaced up to several hundred yards apart.

Polynet also comes with a monitor station, costing \$5,000 with power supply. This station plays no switching or control role during normal operation of the network, but it initiates the operation at power-up and injects the slot pattern into the network at 10 MHz.

During operation, the monitor station performs continuous error monitoring.

Polynet components include a slave power supply unit for \$900; an intelligent direct memory access interface for DEC's PDP-11 minis, costing \$5,000; a similar interface for Intel Corp. Multibus systems, costing \$2,200; an \$800 interface for DEC's LSI-11 systems; and network cabling at \$80 per 100 meters.

Further information is available from Logica VTS at 86 Newman St., London W1A 4SE, England.

## Simulation Information

# Software Monitors BSC, SDLC Links

ST. PAUL, Minn. — NCR Comten, Inc. is offering communications network software that reportedly provides simulation information on the performance of IBM Binary Synchronous Communications (BSC) and Synchronous Data Link Control (SDLC) network links.

The Link Evaluation Model predicts total response time, polling statistics, response time components, utilization and throughput in the form of easy-to-read summary reports, the vendor claimed.

The model computes performance data for specified links and provides summary reports detailing link capacity and response times, a spokesman said. In addition, it analyzes the indi-

vidual components of the simulated response time on the basis of all input variables.

Summary statistical data is computed for user-defined in-

quiry rates (messages per hour) and reported. The first year license fee is \$1,800, the vendor said from 2700 Snelling Ave. N., St. Paul, Minn. 55113.

## Racal-Milgo 4270 Gets SNA, SDLC

MIAMI — Racal-Milgo, Inc. has added IBM Systems Network Architecture (SNA) and Synchronous Data Link Control (SDLC) communications capabilities to its 4270 series of CRT terminal systems.

The SNA and SDLC capabilities are being offered both in the controller-based cluster configuration and the stand-alone system. The 4270 cluster

system includes a Model 4274 controller and up to 32 terminals, while the 4276 stand-alone is a microprocessor-based display station with keyboard. Both systems are compatible with IBM's 3270 series.

Monthly lease prices for the SNA/SDLC capability range from \$23 to \$33, while the purchase price is \$775, factory

installed, or \$1,250 as a field upgrade. Existing 4270 users can be upgraded to SNA/SDLC for a one-time installation charge of \$150.

The new capability will be available for first customer shipment on the 4274 controller in June and on the 4276 stand-alone early next year. Racal-Milgo is at 8600 N.W. 41 St., Miami, Fla. 33166.

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## Unit Converts Data Format

SIMI VALLEY, Calif. — A converter said to allow asynchronous data terminals to operate on a synchronous data link has been announced by Teleprocessing Products, Inc.

The TP-200M accepts data in an asynchronous format and converts it for operation with a synchronous modem, the company said.

It also provides for error detection and retransmission, the vendor claimed.

The TP-200M is priced at \$820, with a polling option at \$125 and an asynchronous control signal option at \$125.

Teleprocessing Products, Inc. is located at 4565 E. Industrial St., Building 7K, Simi Valley, Calif. 93063.

## At Up to 300 Line/Min Controller Gives Local, Remote Printing

MENLO PARK, Calif. — A microprocessor-based controller that gives up to 300 line/min local or remote printing capability to IBM, Honeywell, Inc., Sperry Univac, Burroughs Corp., XDS and Mohawk Data Sciences host computers has been introduced by BDS Corp.

Embedded in the printer, the Model CX1-10A is fully compatible with most communications protocols and requires no changes to existing software, the vendor said.

The 8080 microprocessor and support chips provide RS-232 or 20mA current loop transmissions, handle control signals, convert input code, interpret communications protocols and supply internal diagnostics.

CX1-10A input data may be Ascii, Ebcidic, BCD, Baudot, XS-3 or most other code, BDS said. Transfers are full- or half-duplex, synchronous or asynchronous, with 5- to 8 bit/word. Synchronous data is transmitted at the modem's clock rate, while asynchro-

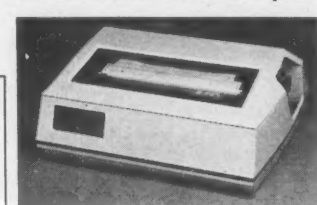
nous data rates are jumper-selectable from 50 bit/sec to 9,600 bit/sec.

The CX1-10A costs \$1,995, and BDS 200 char./sec to 300 line/min printers are priced from \$2,400 each to \$7,300, depending on speed, from 1120 Crane St., Menlo Park, Calif. 94025.

## Matrix Printer From Beehive Operates at 160 Char./Sec

SALT LAKE CITY, Utah — Beehive International has introduced the P1600, a serial matrix printer designed to complement its existing CRT terminal line and support a workstation concept aimed at the end user.

The P1600 requires no preventive maintenance, according to the firm. The unit features 160 char./sec print-



Beehive P1600

ing, compressed print mode, double-sided characters, 7 by 7 dot matrix with upper and lower case characters and a serial RS-232 communications interface. The printer may be controlled locally or via the host processor, depending on the application.

The P1600 is compatible with Beehive's DM3270, an IBM 3276-2-type control unit display station. The P1600 will complete the workstation when utilized with the Micro 4400, a data communications terminal and the firm's DM Series of smart display terminals, the vendor said.

The P1600 costs \$2,395 from Beehive at 4910 Amelia Earhart Drive, Box 25668, Salt Lake City, Utah 84125.

## Pair of Modems Suit International Nets

LEXINGTON, Mass. — Concord Data Systems, Inc. has unveiled its V.21 and V.23 modems for use on international switched telephone networks.

The two modems operate at speeds of 300 bit/sec and 1,200 bit/sec, respectively, and feature CCITT standard capability, lower power and operation of either ac or dc power, the vendor claimed.

For single units, the products cost \$195 and \$205, respectively, the vendor said from 430 Marrett Road, Lexington, Mass. 02173.

## Line Driver Handles Rate of 19.2K Bit/Sec

NORWALK, Conn. — A synchronous line driver designed to provide data transmission over unloaded twisted pair at rates up to 19.2K bit/sec is available from Tri-Comm Industries, Inc.

The SLD-1 uses an internal crystal control oscillator to control clock rates and a scramble to ensure long-term stability over the transmission link, the vendor claimed.

The line driver costs \$365 from Tri-Comm at 20 Fitch St., E. Norwalk, Conn. 06855.

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## Stand-Alone Processor Backs Communications Protocols

MIAMI LAKES, Fla. — A communications processor said to support numerous communications protocols, while providing on-and off-line diagnostics, has been announced by Innovative Electronics, Inc.

The MC-80 features modular software, end-to-end peripheral control and multidrop, polling front ends for minicomputers and device handlers that are available and allow the attachment of various printers, the vendor said.

Diagnostic indications, provided through a seven-segment display, include indications of a device's being

polled or selected, transmission errors and modem status, the company said. The CPU, read-only memory (ROM), random-access memory (RAM) and data paths are always tested, the vendor claimed.

The stand-alone communications processor provides up to 16K bytes of ROM, 16K bytes of RAM, three serial communications port and one parallel printer port, the company spokesman said.

The MC-80 is priced at \$1,595 with delivery from stock within 30 days, the vendor said.

Innovative Electronics, Inc. is located at 15200 N.W. 60 Ave., Miami Lakes, Fla. 33014.

## Courses to Open Career Paths

BURKE, Va. — "International Telecommunications" and "Data Communications Network Components" are the subjects of two courses that will be available through Systems Technology Forum's (STF) Spring '81 seminar program.

The spring program has also been expanded to include six new seminar locations which include San Jose, Calif.; Dallas; Boston; Detroit; Denver and Williamsburg, Va.

The seminars were designed as career advancement study programs for the novice, the advanced and the manager, according to the firm.

The spring seminar training program begins in early April and continues through June. Each course seminar covers two or three days, with prices ranging from \$650 to \$750. Systems Technology Forum is at 8991 Cotswold Drive, Burke, Va. 22015.

## Three Models Join Telex 278s

TULSA, Okla. — Telex Computer Products, Inc. has added three models to its Telex 278 terminal series that offer an expanded character display.

The Telex 278 Model 3 displays up to 2,560 characters in a 32-line-by-80-column format, the Model 4 displays 3,440 characters in a 43-line-by-80-column format and the Model 5 displays 3,564 characters in a 27-line-by-132-column format.

The Model 3 costs \$2,300; the Model 4, \$2,500; and the Model 5, \$2,800. Telex Computer Products is at 6422 E. 41 St., Tulsa, Okla. 74135.

## NEC Controller Board Boasts EIA RS-232

WELLESLEY, Mass. — NEC Microcomputers, Inc. has announced the BP-0575, a five-channel asynchronous serial communications controller with both EIA RS-232 and optically isolated current-loop interface capabilities.

The board accepts data from the host processor in parallel data format and transmits it serially to terminals, modems or printers, the vendor spokesman said.

The BP-0575 costs \$695, the vendor said from 173 Worcester St., Wellesley, Mass. 02181.

## Multifunction Workstation Aimed at NCR Mainframes

PACHECO, Calif. — A multifunctional workstation designed to operate on NCR Corp. mainframes has been released by Century Analysis, Inc.

The CAI-40 workstation is a microprocessor-based terminal that can be used with the CAI teleprocessing monitor, Boss/3. It enables data and word processing functions to operate on the same terminal. It includes a save and recall feature and a buffer area which enables the operator to key at maximum speed.

The CAI-40 workstation contains a high resolution 12-in. display with 24 lines of 80 char. each, plus a 25th line for operator error mes-

sages and terminal status information. The displayable character set is formed on a 7-by-9 dot matrix with a 10-by-10 cell and includes a 128 char. Ascii set and all control codes.

The communications interface operates in either full- or half-duplex asynchronous mode at speeds of 110- to 19.2K bit/sec and is switch selectable. Both RS-232C and 20mA current loop interfaces are standard.

The CAI-40 workstation costs \$1,600 per unit with 16K bytes memory, which is upgradable for an additional cost. The vendor is located at 114 Center Ave., Pacheco, Calif. 94553.

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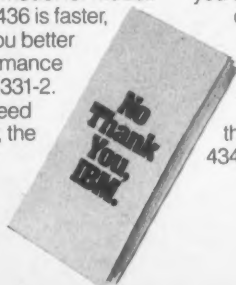
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IPL's 4446 is faster than IBM's newly-announced 4341-2 for most applications,

costs less, and is field-upgradeable from the IPL 4443. First customer shipments of the IPL 4446 will be made in the third quarter of 1981.

To find out more about the new IPL 4400 family, call your local IPL representative. Or call or write: Vice President, Sales, IPL Systems, Inc. 360 Second Avenue, Waltham, Massachusetts 02154. (617) 890-6620.

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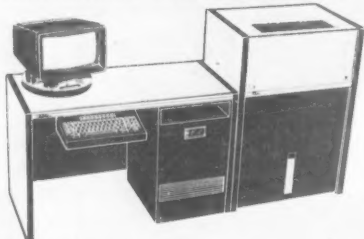
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## Uses Existing Phone Lines

# Desktop Teleprinter Line Debuts

SUNNYVALE, Calif. — A line of desktop teleprinters designed to move message communications smoothly out of the TWX/telex room and onto the executive desk, has been introduced by Trendcom, Inc.

According to the company, the teleprinters can communicate with over 1 million TWX and telex terminals worldwide, as well as direct-dial terminals

and computer systems, using an existing telephone line.

The teleprinters are offered in two models, with 40- and 80 char./line respectively and, Trendcom said, messages can be transmitted as they are typed or prepared off-line, edited if necessary and then transmitted. A 4,000-char. memory stores the message, the vendor explained.

The teleprinters will automatically print messages sent over a regular telephone line from another teleprinter or a computer operating at 110-, 200- or 300 bit/sec.

Single unit prices for the Trendcom 400 is \$595 and \$695 for the Trendcom 800. The vendor is located at 480 Oakmead Parkway, Sunnyvale, Calif. 94086.

# VAX-Based Message Systems Bow

NEW YORK — C&W Intel Ltd. has unveiled a family of systems designed to serve the communications needs of

business and government. The MX700 series of message-switching systems consists of the larger MX780 and the

MX750. The series uses Digital Equipment Corp.'s VAX-11/780 and VAX-11/750 32-bit processors.

The products use the following languages, the vendor claimed: Fortran, Cobol, Basic, PL/I, Pascal, Blis and Cor-1-66.

Prices for the MX750 start at \$250,000.

Prices for the MX780 start at \$400,000, the vendor said from One Penn Plaza, New York, N.Y. 10001.

## Ann Arbor Ambassadors Get Enhanced Capabilities

ANN ARBOR, Mich. — Ann Arbor Terminals, Inc. has enhanced the capabilities of its Ambassador CRT terminals, which implement the Ansi X3.64 standard, by tripling the number of programmable function keys to 48 and increasing the number of bytes available for downloaded strings.

### ZFIM Addition

In addition, a ZFIM function key initialize mode has been added, which loads keys with discrete Escape sequences at power-on.

The Define Area Qualification table has been expanded to allow up to 380 individually defined areas on the page and a variety of new features have been added.

The Ambassador's self-diagnostic capabilities were also enhanced.

## Raytheon Adds Keyboards

NORWOOD, Mass. — Raytheon Data Systems Co. has announced additional keyboards to enhance its PTS-2000 line of CRT terminals.

The keyboards consist of a 75-key primary area with a 12-key auxiliary pad on the right portion of the keyboard.

### Human Factor

As part of the announcement, Raytheon announced a "Human Factor" keyboard that reduces the need to depress the ALT key simultaneously with other keys to activate alternate functions, a vendor spokesman explained.

The Human Factor keyboard is designed for handicapped users, the spokesman added.

The keyboards cost \$280, and the Human factor keyboard costs \$360, the vendor said from 1415 Boston-Providence Tnpk., Norwood, Mass. 02062.

The Ambassador CRT terminal starts at \$1,300 from the vendor headquartered at 6175 Jackson Road, Ann Arbor, Mich. 48103.

## Perry Data Systems Offers POS Terminals

RALEIGH, N.C. — New point-of-sale (POS) and cash collection terminals for use in on-line, interactive cash sales and collection systems have been unveiled by Perry Data Systems, Inc.

According to the company, the PDS 9400 series was designed to enhance return-on-investment management pro-

grams with its CRT display designed to make inventory and pricing data available to the cashier in closing sales.

The 9400 series, consisting of CRT, internal printer and one cash drawer, costs \$3,530 and is available from Perry Data Systems, 3401 Spring Forest Road, P.O. Box 58535, Raleigh, N.C. 27658.

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# Now, unleash the true power of your 4300-type processor.

When you chose a new 4300-type processor, it was to upgrade system performance and reduce ownership costs. Yet, if you select the wrong tape subsystem—a subsystem whose performance is not "balanced" with that of your processor—you can actually strangle throughput and reduce system efficiency. On the other hand, if you choose STC's new 4500 tape subsystem, you can achieve a balanced system, and get all the throughput and CPU utilization for which you've paid.

## A subsystem matched to your processor.

The new STC 4500 is fully compatible with today's intermediate-sized processors, including IBM 360, 370 and 4300 series devices, as well as other comparable units. But more importantly, the STC 4500 incorporates speeds of 75 and 125 ips, and densities of 800 bpi (NRZI), 1600 bpi (PE) and 6250 bpi (GCR). This combination of high-speed and high-density permits the 4500 subsystem to deliver performance equal to that of your CPU, to help achieve a balanced system.

For example, if you compare an STC 4500 with today's streaming tape devices, there's no comparison at all. In data mode, a streaming tape will typically transfer data at a rate of about 20 kb per second, while the STC 4500 offers a data rate of 468 or 780 kb per second. When you use the STC 4500 to backup a high-

performance disk, it outperforms 8809-type devices (see chart below) by a factor of six to one. If you consider total time, this expands to a differential of eight to one, and with 3410 subsystems, the difference is almost nine to one. In sum, the STC 4500 makes frequent disk backup a realistic and cost-efficient alternative—no matter your workload—and at your convenience.

Equally important, the 4500 subsystem also offers enhanced read/write reliability. Users who move from non-STC 1600 bpi (PE) to STC 6250 bpi drives and who take advantage of GCR blocking can reasonably expect an increase in megabytes processed per soft failure of 30 to 35 times that of PE, and an increase in gigabytes processed per hard failure of 18 to 20 times.

## Reduced ownership costs.

Older, 3420-type tape subsystems deliver good performance in certain applications. But their price/performance ratio falls far short of that which you'd expect with a 4300-based system. In comparison, the STC 4500—like a 4300 processor—was designed for use in any office environment. As you can see from the accompanying chart, this means a reduction

of 40% or more in space, power, and air conditioning costs, and eliminates the need for raised flooring entirely. And in this age of spiraling inflation, this can be an important long-term consideration indeed.

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## Features you get only from STC.

The new STC 4500 also gives you several important features you'll find on no other comparable subsystem.

For one thing, the 4500 is a tri-density subsystem. Thus, it eliminates the need for a separate, additional 800 bpi drive. This helps reduce your initial investment, as well as your total cost-of-ownership.

STC's new 4500 tape subsystem can be diagnosed either on-site or remotely. In either event, if one 4500 drive goes down, it can be diagnosed in-line, and

serviced off-line without affecting the remainder of the subsystem's operations. Powerful, built-in diagnostics also help assure enhanced data availability. In fact, the STC 4500 has microprocessor-based diagnostics designed to make fault isolation faster and more effective by permitting the subsystem to be exercised in-line. And special "wake-up" diagnostics will exercise the memory, microprocessor, and interface at power-up to assure proper operation.

## Proven STC technology.

The STC 4500 was designed around technology that has been tested and proved in some of America's largest, and most demanding, data processing shops. In fact, STC is far and away the world's largest supplier of high-performance tape subsystems for the big processor market. And in the 4500 tape subsystem, we've made all this experience and expertise available to the intermediate system user.

## Call now.

Find out for yourself how an STC 4500 tape subsystem can help you achieve a balanced system, reduced cost-of-ownership, new configuration flexibilities and an enhanced level of reliability. For more details, simply call your local STC sales office, phone us toll-free at 1-800-821-7700, ext. 509 (in Missouri: 1-800-892-7655, ext. 509) or write: Storage Technology Corporation, 2270 S. 88th Street, Louisville, CO 80027.

## HIGH PERFORMANCE FOR BACKUP/RESTORE

To Backup/Restore a 3370 (571 MB Fixed)

	NUMBER OF REELS	REWIND TIME	SPIN TIME	PROD. TIME	TOTAL TIME
IBM 3411/10	19	38 Min.	57 Min.	70 Min.	271 Min.
IBM 8809	24	62 Min.	72 Min.	117 Min.	251 Min.
STC 4530 (75 ips)	4	4 Min.	6 Min.	10 Min.	32 Min.

\*Cap size equals 1.2 inches.

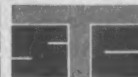
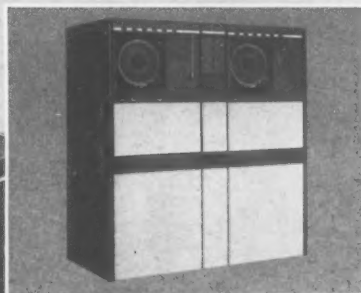
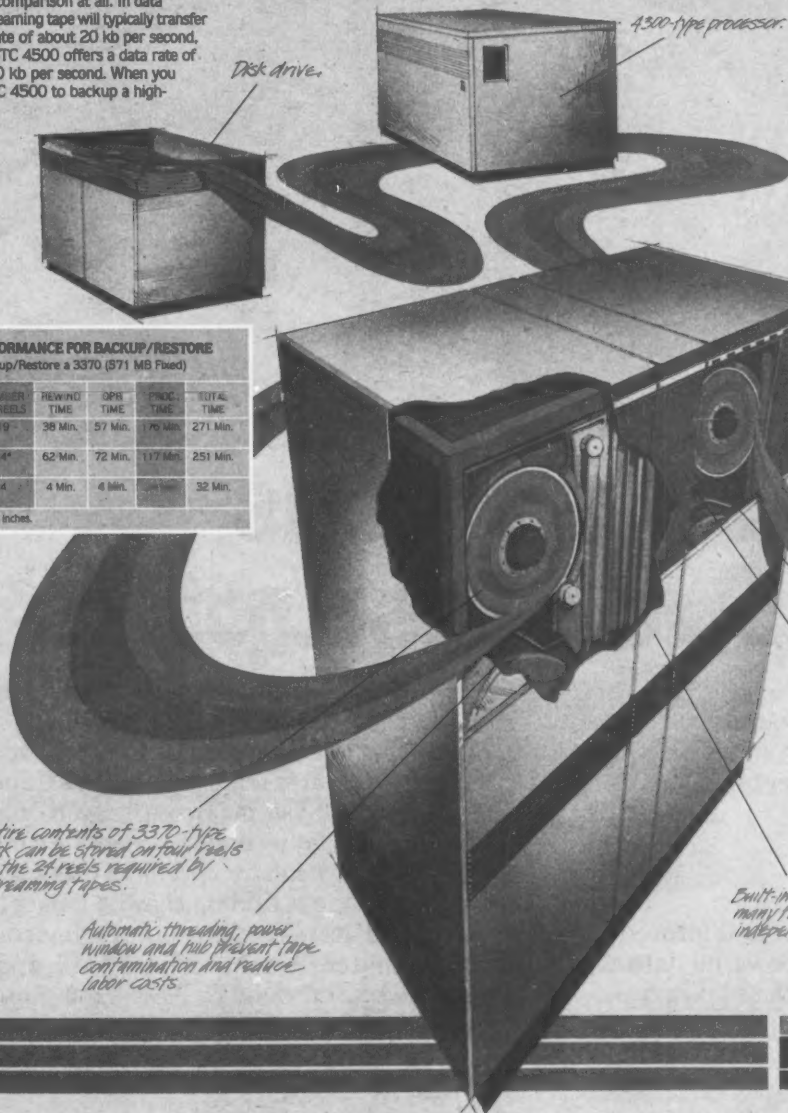
Entire contents of 3370-type disk can be stored on four reels vs. the 24 reels required by streaming tapes.

Automatic threading, power window and hub present tape confirmation and reduce labor costs.

All speeds and densities can be easily upgraded right in the field.

Radial attachment permits a 4500 drive to be switched off-line without affecting any other drive.

Built-in operator panel allows many functions to be implemented independently of your CPU.



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## Avanti Offers 2300H/M To Replace Bell 306 Modem

NEWPORT, R.I. — Avanti Communications Corp. has introduced the 2300 high-speed modem system, available with the EIA RS-449/422 interface, and the 2300 medium-speed modem (2300M.)

The 2300H/M is a direct replacement of the Bell 306 modem, which, in conjunction with the Bell 551A Channel Service Unit, provides 1.544M byte/sec digital service.

It also can be used for in-house computer-to-computer bulk data transfer and for satellite communications data links between earth stations and customer locations. The 2300 series operates in four-wire, full-duplex and point-to-point, internally or externally timed, over unloaded twisted pairs or coaxial cables.

The 2300M operates at data rates between 64- and 460.8K byte/sec. For transmission at higher speeds, the 2300H,

which operates from 460.8K byte/sec to 6.3M byte/sec, is available. Both units utilize bipolar digital transmission techniques, compatible with the Bell 551A Channel Service Unit.

The 2300M and 2300H are priced at \$1,450 and \$1,750 respectively, in single quantities. The vendor is located at Aquidneck Industrial Park, Newport, R.I. 02840.

## Questronics Adds SDLC/SNA For Model 500

SALT LAKE CITY, Utah — Questronics, Inc. has designed a response time module for Synchronous Data Link Control/Systems Network Architecture (SDLC/SNA) type protocol for its Model 500 Performance Monitoring System.

The Model 550 can monitor one of up to 32 allowable device addresses for 3274 and 3276 type equipment operating under SDLC/SNA. It measures and causes a print-out of all transactions that have exceeded a preset threshold.

Any combination of these three groups, which include a Standard Set and Extended Set of Statistics and an 11-category Histogram, will be printed.

The module can store up to 3.17 years of recorded data and 999,999,999 transactions at rates up to and including 9,600 bit/sec. It interfaces with the Model 510 Printer/Controller/Power Supply module.

The Model 550 costs \$550, the vendor said from 3565 S.W. Temple, Salt Lake City, Utah 84115.

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## KMW Unit Fits Printronix Printers

AUSTIN, Texas — KMW Systems Corp. has introduced the Hasp-PX workstation for use with Printronix Inc. P300 and P600 printers.

The Hasp-PX allows attachment of from one to eight Printronix printers to a single box with all Ebcidic-to-Ascii and serial-to-parallel conversion handled internally.

Synchronous communication is via IBM Hasp multileaving binary synchronous protocol, which features CRC-16 error-checking, duplicate character compression and bidirectional communication.

An optional console port allows use of any

standard asynchronous Ascii CRT terminal as a console. Other optional ports can be configured for card readers and other devices. The Hasp-PX features local controls which, via console commands, allow dynamic redefinition of ports and port-to-port data routing.

The Hasp-PX supports user-selectable data rates of 300-, 600-, 1,200-, 2,400-, 4,800-, 9,600- to 19.2K Hz on any of the serial ports. The base price of the Hasp-PX is \$4,250; optional ports cost \$750 each, the vendor said from 8307 Highway 71 W., Austin, Texas 78735.

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## IDS Offers Enhanced Model 6000, Rechargeable RS-232C Interface

LINCOLN, R.I. — International Data Sciences, Inc. (IDS) has made product announcements involving a modem, interface monitor, test set and bit error-rate tester.

The Model 6000 Limited Distance Modem (LDM) has been enhanced to transmit over loaded lines (Bell 3002 voice band channels) when operating at speeds of 2,400-

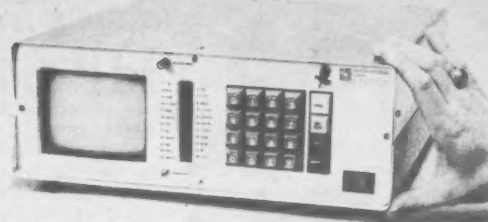
or 4,800 bit/sec. The modem is available in two models and operates over Telco Research Corp. or private 2- or 4-wire metallic (twisted-pair) conductors. It costs \$635.

IDS has also unveiled a rechargeable version of its Model 60 EIA RS-232C Interface Monitor and Breakout Panel. The Model 60 is a pocket-sized, portable test set

designed to provide access to all 25 conductors of the EIA RS-232C interface, and costs \$250.

The Hawk 4010 Datatrap is a portable, diagnostic data communications test set designed to monitor and interactively communicate with data appearing at the EIA RS-232C interface. It costs \$7,500.

The Model 65/60 bit error-



The Hawk 4010 Datatrap

rate tester is a miniaturized modem test set reportedly capable of performing bit error-rate tests on synchronous and

asynchronous EAI data communications channels. It is comprised of EIA monitor and breakout panel and costs \$850, the vendor said from 7 Wellington Road, Lincoln, R.I. 02865.

## Unit Couples RS-232C Gear With RS-449

WOODBURY, N.Y. — An interface converter designed to allow coupling of RS-232C-based equipment with devices employing the new industry standard RS-449 is available from Remark Datacom, Inc.

The Model 60 incorporates the switching facility to allow the user to select the RS-232 as data communications equipment or data terminal equipment. Support of reverse channel for the RS-449 is provided by the required 9-pin male connector.

The Model 60 is compatible with the Dataphone II modems from Western Electric Co. and other modems, the vendor claimed.

It costs \$115, from the vendor at 4 Sycamore Drive, Woodbury, N.Y. 11797.

## Rolm Newsletter Targets MIS Field

SANTA CLARA, Calif. — A bimonthly newsletter addressed to management information systems (MIS) and telecommunications professionals in the voice and data communications field has been launched by Rolm Corp.

"Network" is intended to provide telecommunications, data processing and MIS managers with news of technological achievements, a spokesman said.

Free copies are available from Mike Harris, Editor, Network Newsletter, Rolm Corp., 4900 Old Ironsides Drive, M/S 525, Santa Clara, Calif. 95050.

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HP's Model 64005S Emulation Terminal System gives advantages of Model 64000.

## Boosts Mainframe Users HP 64005S Terminal System Bows

PALO ALTO, Calif. — Hewlett-Packard Co.'s Model 64005S Emulation Terminal System reportedly lets mainframe users augment their time-sharing services, minicomputers and other development systems with emulation of the HP Model 64000 Logic Development System.

With RS-232C (V.24) or current loop interfaces for serial data links to the computer, the HP 64100A Development Station can be used as an ASCII terminal or a stand-alone emulation station. A logic analysis option is available.

Emulation features enable microprocessor product developers to evaluate hardware and software performance at

any stages of development, the vendor said. The data link transfers Intel Corp. or Tektronix, Inc. hexadecimal file formats in either direction, and the emulation station will accept HP 64000 absolute file format. Separate software modules for 8080/8085, 6800 and Z80 microprocessors are available for the Emulation systems.

A basic Model 64005S Emulation Terminal System consists of a development station with a tape cartridge drive and emulation hardware and software for the selected micro.

Each emulation terminal contains a host processor with 64K bytes of host memory, I/O control and display control. Each terminal can be configured

for the particular application needs by adding optional 200-nsec memory and real-time transparent analysis capability.

The price of the Model 64005S Emulation Terminal System is \$14,400 to \$22,600. Additional software is available at \$550. Deliveries are in 12 to 16 weeks, the vendor said from 1507 Page Mill Road, Palo Alto, Calif. 94304.

## Device Ends Need of Modems In TPNS Work

NORWALK, Conn. — Datacomm Management Sciences, Inc. has introduced a modem eliminator which it says allows interconnection of data terminal equipment without the need for modems in applications such as IBM's Teleprocessing Network Simulation (TPNS) program.

The ME-31 regenerates data and clock interface signals so that a 50-ft interface cable may be used at each terminal interface while supplying Data Set Ready to both terminal devices and presenting Carrier Detect to either terminal when the other terminal's Request to Send lead is activated, the vendor claimed.

The ME-31 is priced at \$315 from Datacomm Management Sciences, Inc., 818 Main St., Norwalk, Conn. 06851.

## Amtek Replaces Rival CRTs

SANTA CLARA, Calif. — A CRT terminal designed to replace terminals from Hazeltine Corp., Applied Digital Data Systems, Inc., Soroc Technology, Inc. and other terminal makers has been introduced by Amtek Business Machines, Inc. (ABM).

Standard features include high-resolution, nonglare green screen; numeric and special function keypad; full video attributes; advanced editing; block mode; monitor mode; protective and unprotective fields; foreground and background; programmable key-click; and margin bell.

The ABM 80 costs \$895 from the firm at 2255H Martin Ave., Santa Clara, Calif. 95050.

## User's Guide Available On Security, Protection

HAGERSTOWN, Md. — A user's guide on voice and data communications security discussing the problems associated with communications security and recommending protection is available from Marketing Consultants International, Inc.

"Who, What, & Where in Communications Security" is written for non-technical readers and covers telecommunications, word processing, facsimile communications, electronic funds transfer and other office communications equipment, the vendor claimed.

The advance price is \$175, the vendor said from 100 West Washington St., Hagerstown, Md. 21740.

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We start with our April 27th National Computer Conference Review Issue. Everything you need to know about the show before it's happened. We'll include the sessions, tell you who's speaking, review the exhibitors and what they'll be exhibiting. You'll even read about Chicago nightlife and where to go when you're not at the show. Extra issues will be distributed at the Computerworld booth at NCC. Black and white ad close is April 17th. Color close is April 10th.

Then our NCC Show Issue comes out May 4th, the day of the show. It will have last-minute show information, speech previews and other show details. Pick up a copy at the Computerworld booth. Black and white ad close is April 23rd. Color close is April 17th.

Finally, our May 11th NCC Wrap-up Issue will have complete coverage of all that happened. Prepared by our 25-person editorial staff, you'll read who said what, who introduced what and how it works, and review the show's features and highlights in words and pictures. Black and white ad close is May 1st. Color close is April 24th.

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## 'Leader of the Revolution'

By Tim Scannell  
CW Staff

SANTA ANA, Calif. — Leonard Eckhaus turned in his resignation as computer operations manager at the Los Angeles County Superintendent of School's Office last week and quietly put on his new hat as leader of the revolution.

This revolution, at the very least, threatens to bring an air of professionalism to a territory that some managerial snobs long ago gave up as a semiprofessional lost cause — the computer room.

Driven by what he terms "an industry need," Eckhaus recently formed the Association for Computer Operations Managers (Afcom). The organization resides

under an umbrella company, Data Center Management Services, also created by Eckhaus.

### Professional Recognition

Afcom, reportedly a first-of-its-kind organization for operations managers, not only seems to promise computer operations personnel some industry recognition, but can also be used as a medium to discuss operations problems and gripes, Eckhaus said. The association has a publication devoted exclusively to managing computer operations, a regular schedule of conferences and even an annual salary survey.

"The computer operator of today has an

awful lot he has to know and handle," Eckhaus explained, noting that he has worked for about 15 years on the operational side of the street. "He's got tremendous responsibility, especially when you think of the impact operational errors can make on an organization."

### Breaking Barriers

Although Afcom's major thrust will be to educate the computer operations professional on the latest and best ways to organize tape libraries, cut down on room noise and ensure system security, it will also seek to break down the barriers between operations and programming.

(Continued on Page 76)

## Future Systems — Part 3

# Two-Bus, Dedicated Systems in Store

By Frederic G. Withington  
Special to CW

CAMBRIDGE, Mass. — General-purpose computers systems five and 10 years from now will probably contain two communications buses and multiple computers that are dedicated to specific system functions.

The two buses will consist of a very high-speed line for transmitting data transmitting data and programs — probably a fiber-optic bundle — and a control bus for transmitting brief control messages between processors.

The specific function of each internal processor will usually be determined by variable stored logic. The processors will communicate with one another via messages and data blocks in standard form, regardless of whether the content is a program, data, digitized text, imagery or even voice.

However, there will no longer be a single, shared storage serving all the processors. Instead, storage will be dedicated to individual processors or clusters, similar to today's tightly coupled microprocessors. These clusters will typically be used for I/O processing, file processing and for specialized computing tasks where arrays of processors can be applied in parallel to tasks like image manipulation.

Under two special circumstances processors will be able to share one another's storage:

- When one processor wants to exchange material with another.

- When the supervisory processor detects a failure in a functional processor. In this case the supervisory processor will direct

*In this third part of a four-part series on future computer systems, the author examines the architectural possibilities of tomorrow's machines and discusses why the concept of a single processor in a single box may be outdated. Next week, he tackles that elusive industry animal, distributed data processing.*

another of the functional processors to read the contents of the failed one's storage, so that its work may continue.

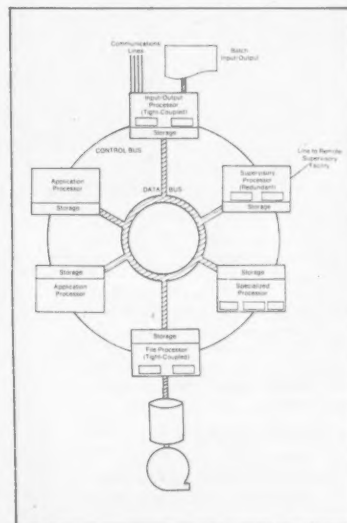
Such a modular computer system will be able to employ widely varying sets of functional processors.

A supervisory processor will always be present. Containing redundant small computers, it will be responsible for measuring overall system performance and for sensing and diagnosing equipment failures.

It will be capable of assigning processor and storage modules to overall classes of work in accordance with assigned priorities and of reassigning them in the event of failure. It will also have its own modest input/output capability for receiving and displaying supervisory information and for communication with a remote supervisory and diagnostic facility when necessary.

An input/output processor will also be present. Its size and nature will vary widely, but it will usually be capable of controlling the attached communications lines and of switching messages between terminals

(Continued on Page 76)



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## Course to Examine Univac 1100 Performance

WASHINGTON, D.C. — Performance evaluation of Sperry Univac 1100 systems is the topic of a five-day course to be given here from April 29 to May 1 by Datametrics Systems Corp.

The course, costing \$695 per person, will focus on how to make effective use of performance data collected from the Master Log File, the Software Instrumentation Package and

TIP Statistics Monitor.

The instructor for the course is Dr. John C. Kelly, who has extensive experience in both teaching and consulting in the area of Univac system performance and has written more than 20 books.

Further information on the course may be obtained from Datametrics Systems Corp., 5222 Dunleith Drive, Burke, Va. 22015.

## Two-Bus, Dedicated Systems Seen

(Continued from Page 75) whether they contain data, text or digitized imagery or voice. It will also control local batch I/O devices such as line printers.

A file processor will usually be present. In small systems it may be a single, small processor doing no more than managing a hierarchy of devices to protect data against loss. In large systems the file processor will be performing access control, management and re-

trieval functions.

It will be redundant for reliability and may incorporate associative and/or parallel processing capabilities for searching and retrieval.

### Application Processors

Application processors will be dedicated to particular computational environments. Some will be oriented to direct execution of programs written in specific programming languages, while others will sup-

port problem-oriented languages. Still others will be oriented to running the software of obsolete machines.

The orientation of each application processor will be specified by variable stored logic; within limits the processor orientations can be changed via the supervisory processor to meet changing work loads.

Specialized processors of various kinds will also be available. These will include array and vector processors, and perhaps others designed for voice and pattern recognition.

Modern minicomputers approach this architecture now, though not all the functional processor types have been developed yet. Larger general-purpose systems are evolving more slowly. Performance requirements are more stringent, and the manufacturers are constrained by software investments in older systems.

Some of the latest types of distributed office systems also approach this architecture. By the late 1980s virtually all computer systems will employ this type of architecture; in the interim the systems available will be of a transitional nature.

Withington is vice-president of the Information Systems Group at Arthur D. Little, Inc. in Cambridge, Mass.

## Revolution Under Way

(Continued from Page 75)

In most corporations, interaction between the programming and operations staffs is limited to passing tapes, punched cards and job control instruction sheets through breadbox-sized windows. On a good day, both parties may see whose face is attached to a hand.

"If operations personnel are accepted more on a professional level, I think — but I'm not sure — that some of these barriers will come down," Eckhaus stated.

Thus far, response to Afcom and its ideas has been "very, very good," the association's founder and president said. Already 74 companies have elected to sponsor their operations managers as members, and Eckhaus expects his ranks to swell to at least 400 in a year's time.

Eckhaus is actively seeking case stories, how-to articles and general input from operations managers and computer jockeys for his publication, which is slated to roll off the press shortly.

Afcom can be reached through Data Center Management Services, 3605 "E" South Bristol, Santa Ana, Calif. 92704.

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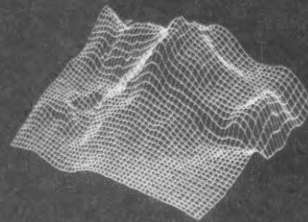
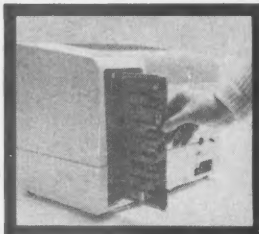
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## Response Time Improved Univac 1100 Gains Disk System

BLUE BELL, Pa. — Sperry Univac has announced a disk system for its 1100/80 and 1100/60 systems said to provide significant response-time improvements.

The Cache/Disk System consists of processors managing solid-state memory interposed between central processor and disk drives, the company spokesman said.

Data that is frequently accessed is held in semiconductor memory and can be transferred to the host system without waiting for a long seek and latency time, the vendor claimed.

The intelligent 5057 processor provides disk system control that functions as an I/O peripheral system at-

tached to the 1100/60 and 1100/80 word channels, the company said.

### Storage Unit

The 7053 Storage Unit utilizes 16K bytes of random-access memory to provide a capacity of 917,504 words of

fast access data, the vendor said.

Price of the Cache/Disk Systems is \$104,700 for the 5057 processor and \$137,534 for the 7053 Storage Unit with initial deliveries scheduled for December from Sperry Univac, P.O. Box 500, Blue Bell, Pa. 19424.

## Prices Hiked 5% on MSI Gear

COSTA MESA, Calif. — MSI Data Corp. has announced a 5% price hike on its line of hand-held data entry terminals and memory upgrade kits.

Prices for the models now range

from \$850 to \$2,700, depending on memory configuration, the vendor said.

MSI Data Corp. is headquartered at 340 Fischer Ave., Costa Mesa, Calif. 92626.

## What you don't know about office automation can hurt you.

**You'll get all the information you need at the Invitational Systems Conference April 23-24.**

This is a conference with a difference, brought to you by the CW Conference Management Group, the people who bring you *Communications Networks*. Take a quick look at what's in store for you at ISC '81:

### Vendors but—no booth-hopping!

You'll get the best aspects of conventional exhibit and conference programs—without the headaches. You won't have to go booth-hopping between sessions to see the latest in equipment advances—you'll get scheduled demonstration sessions with four top vendors: DEC, AB Dick, Royal Business Machines and Lanier.

You'll get a choice between Basic and Advanced sessions designed to meet you where you are and take you on to the kind of experience you need to take the lead in office automation procedures.

### Basic Sessions chaired by Walshe and Eisen

The Basic Sessions deal with everything from the need for word processing to cost justification through getting underway, implementing, office communications and management and control for day-to-day operation.

Basic Sessions on the first day will be chaired by Willoughby Ann Walshe, executive editor, *Word Processing Information Systems* magazine and *Information & Word Processing Report* newsletter, published by Geyer McAllister, N.Y.C. The second day chair of the Basic Sessions is Jerrold J. Eisen, president of Offices Sciences International Inc., a subsidiary of Communications Sciences Inc.

### Advanced Sessions stress integration

The Advanced Sessions begin with comprehensive work on office automation concepts through problems and solutions and a double session on achieving full integration. There'll be guidance sessions on applica-

tions planning, word processing, interface options and even electronic mail.

Norman M. Martin, chair of the first day Advanced Sessions, is president of his own consulting firm and has 25 years experience with word/information/data processing equipment and systems as well as digital data communications. Robert Greenblatt, president of National Word Processing, Inc., a firm specializing in the design and implementation of administrative programs to integrate data processing and word processing, will chair the second day Advanced Sessions.

### Session speakers combine years of user wisdom

Session speakers for ISC '81 are: Gerald S. Maskovsky, director of the Office of the Future, consulting in the management consulting service unit of Coopers & Lybrand; Stevan Silva, manager, interactive service division of Management Information Services with the Commercial Union Insurance Company; Sylvia M. Courtney, office automation manager with the Commercial Union Insurance Company; Peter F. Polizzano, vice president, marketing programs for CompuScan, Inc.; Eugene Starr, director of corporate development for ONTEL Corp.; Herbert Lovit, founder and chairman of the board of Communication Sciences, Inc.; Joseph Ramellini, director, advanced office support systems with CBS, Inc.; Patricia Rieno, manager, administrative support service with Olin Corp.; Angelo Cappello, office services manager, PepsiCo, Inc.; Herb Fried, systems officer, Citibank of New York, and Lawrence Feidelman, president, Management Information Corporation.

**REGISTER TODAY:** The Invitational Systems Conference on Word Processing and Data Processing produced by CW Conference Management will be held at the Rye Town Hilton in Westchester County, New York. The conference fee is \$295 per person and covers two days of sessions and two luncheons. **For more information or to register call Louise Myerow, Registration Coordinator, on our toll-free number: 1-800-225-4698, ext. 435. In Massachusetts call (617) 879-0700, ext. 435.**

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Louise Myerow, Registration Coordinator.

CW

## Axiom Offers Impact Printers

GLENDAL, Calif. — Axiom Corp. is ready to distribute what it claims is an impact printer more economical in use and costing far less than its competitors.

The GP-80M, manufactured by Seikosha, a subsidiary of the Japanese Seiko group, prints graphics and alphanumeric by using a single print hammer.

Standard features of the GP-80M include ASCII uppercase and lowercase character sets, adjustable tractor feed and three-copy reproduction.

The printer costs \$399. Further information is available from Axiom at 1014 Griswold Ave., San Fernando, Calif. 91340.

## Zeta Plotters Get Interface

CONCORD, Calif. — The Nicolet Zeta Corp. has announced an interface that it says allows its intelligent drum plotters to be used as plug-compatible replacements for California Computer Products, Inc. 960 plotters.

The plotters feature a continuous feed paper system that allows multiple plots to be generated without operator intervention, the vendor claimed.

The interface option for the Zeta 5400 and 3620 plotters is priced at \$2,000 with delivery in 60 days from Nicolet Zeta Corp., 2300 Stanwell Drive, Concord, Calif. 94520.

## Display System Boasts High Image Resolution

ENGLEWOOD, Colo. — Sigma Design West, Ltd. is offering a display system with an image resolution reportedly greater than 1,000-by-1,000 pixels.

Created as an optional display system for the Sigmagraphics II computer-aided design (CAD) system, the display has screen sizes up to 25 in. and features parallel processing by accepting local generation of drawing details (symbols, texts and so on) with its on-board microprocessor, the vendor claimed.

Parallel processing of standardized elements does away with the traditional individual transmission method used in conventional direct-view storage tube (Dvst) displays, a spokesman said.

The Sigmagraphics II system costs around \$100,000, the vendor said from 7306 S. Alton Way, Englewood, Colo. 80112.

## Graphics Controller Gives 36 Colors

READING, Mass. — Datacube, Inc. is introducing a single-board video raster graphics controller featuring on-board memory with the ability to create a 36-color RGB output, the company said.

The VG-220 was designed to simultaneously digitize and store real-time data from a TV camera, center it into the on-board and display it on a monitor. Priced at \$2,495, the controller is compatible with Datacube's Multibus and Q-Bus systems and is available from the vendor at 670 Main St., Reading, Mass. 01867.



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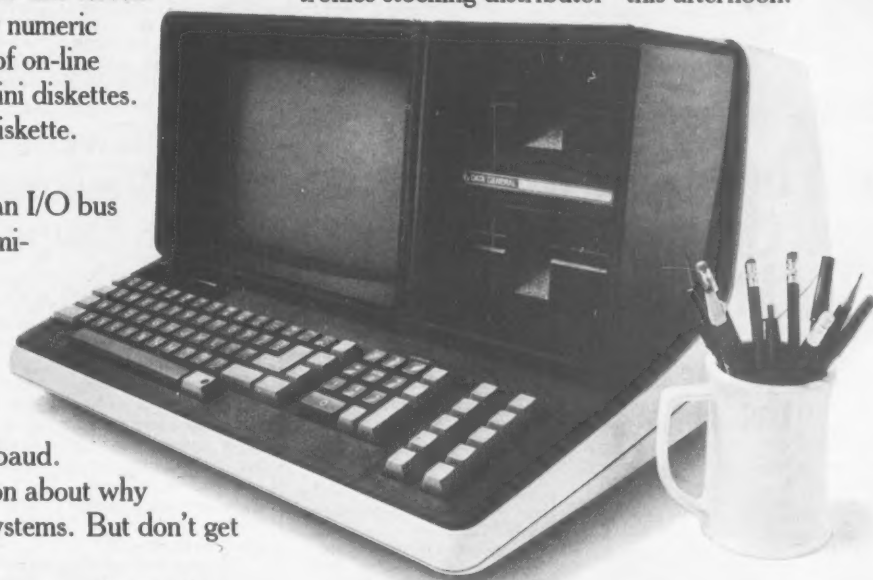
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## Modcomp Adds Mid-Range Unit To Disk Line

FORT LAUDERDALE, Fla. — Modular Computer Systems, Inc. (Modcomp) has added a mid-range rotating storage device to enhance its disk product offering.

This device provides 26M bytes of formatted data in a single freestanding unit. The total capacity is divided into 13M bytes of fixed media and 13M bytes of removable media, the company explained.

Features include front-loading cartridge, microprocessor-based logic, off-line diagnostics and fault isolation and retention.

The 26M-byte device is reportedly fully compatible with Modcomp Computer Systems' entire 417X series of disks.

The 26M-byte device and controller is priced at \$18,250 and can be ordered with a system or added to existing systems.

Production quantities will be available by May, according to the vendor, which may be reached through P.O. Box 6099, 1650 W. McNab Road, Fort Lauderdale, Fla. 33310.

## Board Gives Voice Response, Speech Output

PALO ALTO, Calif. — An electronic voice-response board reportedly capable of producing natural lifelike speech quality is being offered by Telesensory Speech Systems.

Words, phrases and sentences are stored on the board and, when electronically addressed, the stored messages can verbally communicate status, instructions, alarms, requests or other announcements.

The unit can store up to 458K bits and can interface with Multibus, parallel I/O or serial I/O.

It includes a 40-word vocabulary, the vendor's custom PDSP synthesizer and an 8085 microprocessor controller, the firm said.

The Series II Mini-Speech board costs \$125 in quantities of one to 99 in English, German or French. Series III Modules cost \$345 in one to 49 quantities for a 64-word standard set including synthesizer, vocabulary, bus-compatible interface, audio filter and amplifier on a printed circuit card with a 20-pin edge connector and corner mounting holes.

The vendor can be reached through P.O. Box 10099, 3408 Hillview Ave., Palo Alto, Calif. 94304.

## HP Graphics Tablet Based on Series 80

PALO ALTO, Calif. — Hewlett-Packard Co. has unveiled a graphics tablet for its Personal Graphics System, which is based on the Series 80 personal computer.

The HP 9111 Graphics Tablet reportedly draws schematics, floor plans, overhead transparencies and digitizes existing graphics.

The product costs \$2,050, the vendor said from 1507 Page Mill Road, Palo Alto, Calif. 94304.

## BDS-900 Gives 900 Line/Min

MENLO PARK, Calif. — BDS Computer Corp. has announced a microprocessor-controlled 900 line/min printer.

The BDS-900 incorporates diagnostic routines and a dual-digit status display, the vendor spokesman said.

The printer costs \$11,600 and interfaces and controllers range from \$3,500 to \$6,500 depending on the host, BDS said from 1120 Crane St., Menlo Park, Calif. 94025.

## Eikonix Offers Image Systems For Custom Use

BEDFORD, Mass. — A family of image-processing systems and components designed to allow customized configurations from small image analysis stations to large multiuser distributed processing systems is now available from Eikonix Corp.

The Eikonixcan EC-100 Series may contain combinations of host CPU, image digitizer, array processor and mass storage and display, the firm said, as well as compatible options such as I/O devices, keyboards, digital tablet and track ball.

The system uses Eikonix' picture processing language (Epl) running under Digital Equipment Corp. RSX-11M and was designed to allow the user to perform functions such as image digitizing, data transfer and manipulation.

The systems range in price from \$75,000 to \$200,000 and applications include image analysis and processing, feature recognition, metallurgical structure and graphics.

Deliveries are available from the vendor at 23 Crosby Drive, Bedford, Mass. 01730.

## Avera Offers Mask Design, Schematic Entry

SCOTTS VALLEY, Calif. — The stand-alone, desktop IC Designer System being offered from Avera Corp. brings in-house IC mask design and schematic entry to almost any electronics firm, its vendor said.

The IC Designer is compatible with all major computer graphics and analysis systems and the interface provides full aids to command execution and rapid input via the Mouse, the system's primary graphics input, a spokesman explained.

Other features include on-screen menus, user-definable symbol recognition, split screen with full text response, user-written macro support and selective erase.

A high-resolution raster display permits a single display to be used for both alphanumeric and graphic functions and allows individual updating of each area, according to the vendor spokesman.

Prices for the IC Designer start at \$40,000 from Avera, 340 El Pueblo Drive, Scotts Valley, Calif. 95066.

## Mini Bits

### Two Floppy Disk Subsystems Offered for PDP-11s, LSI-11s

IRVINE, Calif. — Two dual-density floppy disk subsystems for Digital Equipment Corp. PDP-11 and LSI-11 mini and micro systems have been introduced by Plessey Peripheral Systems.

The PM-XS31 and PM-SXV31 reportedly have twice the capacity of previous equivalent DEC subsystems, with both the Unibus and Q-Bus-compatible controllers able to support two floppy disk drives for a maximum capacity of 2M bytes per subsystem.

The PM-XS31 was designed for use with PDP-11 and is software-transparent to DEC operating systems. The PM-SXV31, priced at \$2,610, was designed for use with the LSI-11 series of microcomputers.

Further information on the products can be obtained from the vendor at 1691 Brown Ave., Irvine, Calif. 92714.

### Memory Boards for LSI-11 Provide 256K-, 128K Bytes

CANOGA PARK, Calif. — Andromeda Systems, Inc. has unveiled two memory boards for Digital Equipment Corp. LSI-11 microcomputers.

The MEM11-128 and the MEM11-64 provide 256K bytes and 128K bytes, respectively. The cards are intended for use in LSI-11/23 systems that can utilize memory in excess of 64K bytes, the vendor said.

The vendor is also offering a package consisting of an LSI-11/23 CPU and MEM11-128. Designated KDF11-128, it costs \$4,990. The MEM11-128 alone costs \$2,990 and the MEM11-64, \$2,390. Andromeda said from 9000 Eton Ave., Canoga Park, Calif. 91304.

### Single-Board, 16-Bit Micro Holds 32K Bytes of Eprom

HILLSBORO, Ore. — Intel Corp. has unveiled a single-board, 16-bit microcomputer with 8K bytes of random-access memory (RAM) and capacity for 32K bytes of erasable programmable read-only memory (Eprom).

The ISBC 86/05 features an Intel IAPX 86/10 microprocessor with an 8- or 6-MHz clock. It is compatible with the ISBC 337 Multimodule Numeric Data Processor. The 337 employs the vendor's 8087 arithmetic chip, which yields a performance of 110,000 whetstone/sec, the vendor claimed.

The microcomputer costs \$1,790 from Intel at 5200 N.E. Elam Young Pkwy., Hillsboro, Ore. 97123.

### Dataram Expands DR-144S To 1M Bytes; Fits PDP-11/44

CRANBURY, N.J. — Dataram Corp. has expanded its DR-144S add-in memory to 1M bytes.

The memory can be used with Digital Equipment Corp. PDP-11/44 processors and uses 16K-bit random-access memory (RAM) chips.

The 1M-byte memory version costs \$14,200, the vendor said from Princeton Road, Cranbury, N.J. 08512.

### Single-Density Controller For TI 990/4 Gives 64K Bytes

ANAHEIM, Calif. — Express Computer Systems, Inc. is offering a single-density floppy controller that offers 64K bytes of memory for Texas Instruments, Inc. 990/4 systems.

The controller costs \$3,150 and can be purchased independently or with a matching dual floppy drive.

Express is at 1441 S. State College Blvd., Anaheim, Calif. 92806.

## Micro-Based Turnkey Has Error-Correcting Controller

WESTLAKE VILLAGE, Calif. — Vector Graphic, Inc. has introduced a microprocessor-based small business system incorporating an error-correcting floppy disk controller board that reportedly eliminates all but severe disk damage.

The Vector 2600 has a Z80-based single-board computer with 64K bytes of memory; dual, double-sided, quad-density floppy disk drive with up to 1.2M bytes of storage capacity; and a console with 12-in. CRT and keyboard. Software included with the turnkey system consists of the CP/M2 operating system, Scope screen-oriented program editor, Raid debugger, ZSM assembler and Microsoft Basic 80 Release 5.

The 2600 uses the company's proprietary error-correcting controller board, which debuted in the firm's 3005 Winchester disk computer system. The Dualmode controller is based on IBM technology and is said to correct up to five erroneous bits automatically in every 256 bytes transferred from disk to the CPU. The board reportedly eliminates errors resulting from disk contamination, aging and surface defects.

In addition to error correction, the 2600's floppy disks have a 3-msec, track-to-track, and 75-msec average access time. The disks also feature a rigid design for enhanced reliability, a spokesman said.

Finally, the Dualmode board features 256-byte sector buffering which enables the



Vector Graphic 2600

system to handle interrupts and data transfers in and out of memory simultaneously for communications tasks and other real-time functions, the spokesman added. Communications and network applications are coordinated through the 2600's S-100 bus with an RS-232 interface port and its compatibility with all other existing Vector Graphics software.

Optional software for the 2600 includes Vector Memorite III word processing software and the firm's Execuplan, a video calculator for financial planning and modeling.

The system is aimed at accountants and small business people and costs less than \$6,000 from the company at 31364 Via Colinas, Westlake Village, Calif. 91362.

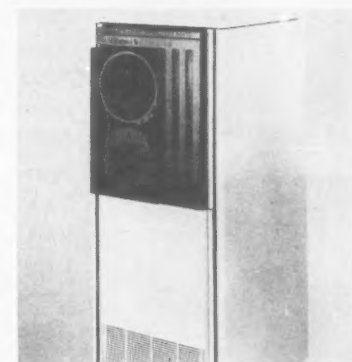
## Tape Subsystem for HP 3000 Transfers 320K Byte/Sec

PALO ALTO, Calif. — A tape subsystem for Hewlett-Packard Co. computers that reportedly makes it possible for HP 3000 users to transfer data from a disk in a steady stream at 320K byte/sec while retaining the traditional, logical file sequence on the tape is available from HP.

The 6,250/1,600 bit/in., Ansi-format, .5-in. HP 7976A can complete a 400M-byte disk backup, with files in logical sequence on tape, in less than 30 minutes, the vendor claimed.

The subsystem consists of a tape transport, formatter/controller unit and an HP-IB (IEEE 488) interface controller in an upright cabinet. The transport can read and write at 75 in./sec and rewinds at 250 in./sec.

The 7976A costs \$52,500 from HP at 1507 Page Mill Road, Palo Alto, Calif. 94304.



HP 7976A

## Tally Tied to DG Nova, Eclipse

KENT, Wash. — A printer controller that reportedly allows Data General Corp. Nova and Eclipse computer users to interface directly to Mannesmann Tally serial and line printers is available from Mannesmann Tally.

The controller fits into the 15-in. I/O card slot in the two computers without software or hardware modification and handles printer speeds from 160 char./sec to 300

line/min, the vendor claimed.

The product is compatible with DG RDOS and AOS as well as Iris and other DG operating systems, a spokesman said. Both programmable and channel controllers are available.

The controller must be bought with a printer, and combination prices range from \$3,320 to \$7,595, the vendor said from 8301 S. 180, Kent, Wash. 98031.

## Aviv Announces Dual-Port Option

WOBURN, Mass. — Aviv Corp. has announced an optional dual-port capability for its GCR 6,250 bit/in. tape systems for Digital Equipment Corp. PDP-11 and VAX-11 minicomputers.

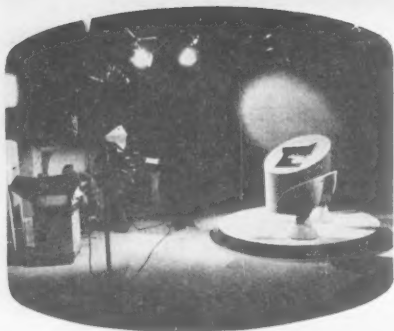
The option allows nonsimultaneous access from two processors to the same

bank of tape drives. The option does not require software changes, the vendor spokesman said.

The dual-port option costs \$10,500 and comes in a 5.2-in. rack-mountable chassis, the vendor said from 6 Cummings Park, Woburn, Mass. 01801.

MINI-TWO-PORT





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- Lawyers who are using computers to analyze supreme court decisions.
- Privacy experts who are trying to prevent computers from creating a "big brother" society.
- The psychologist who uses computers to study criminal behavior.
- DP experts in banks whose techniques are doing to paper money what money did to the barter economy.
- Computer people in business who have used computers creatively to improve their businesses — or to create whole new ones.
- Weather experts who use computers vs. the Old Farmer's Almanac.

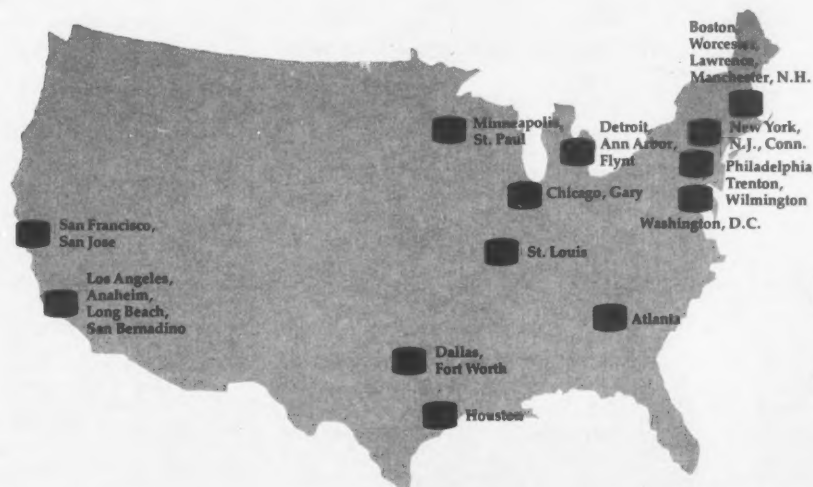
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There's much more to Computerworld for television, but we can't go into it all. We invite you to find out for yourself. Both experts and interested laymen will enjoy and benefit from this unique new television experience. We're starting with coverage of 13 major tv "ADI'S" (Areas of Dominant Influence), which include about half the computer people in the U.S. Later we will add more markets.

These are the areas we'll be covering. Watch this space for station, time and start date.



## Floppy Disk Controller Fits Multibus Systems

SAN FRANCISCO — Micromation, Inc. has announced a single-board floppy disk controller for Multibus systems which the company said is capable of reading from and writing to 8-in. diskettes in single and double density.

The MM-SBC-80F Controller is compatible with Intel Corp.'s ISBC-201 and ISBC-202 controllers and satisfies Intel's controller conventions for reading from and writing to diskettes, the vendor claimed.

Without drives, the MM-SBC-80F is priced at \$995, or it can be purchased with a set of Shugart Associates SA-801 single-sided tape drives for \$3,195 from Micromation, Inc., 1620 Montgomery St., San Francisco, Calif. 94111.

## With Customized Services Conference System Expanded

WALKERSVILLE, Md. — The Galaxy Conference and Exposition System created by Digital Systems Corp. now offers customized computer services to exhibitors and show managers.

The Galaxy system handles all the basic registration functions plus a myriad of manager/exhibitor information service options using portable CRTs and printers on-

site, Digital said. The system runs on a multiplexor which interfaces with the five Galaxy/5 minicomputer systems at Digital headquarters.

### Block Bookings

Convention and show managers can use the Galaxy system to arrange block bookings of hotel rooms, travel accommodations and seating for banquets. It also can register

attendees for special meetings and events, set up a message center service and a locator service, the vendor said.

An additional option is a billing and financial control capability which produces individual, itemized consolidated invoices.

The cost of the Galaxy system depends upon the size of the show or exhibition. For example, for one involving 8,000 attendees, the basic Galaxy system (not including the billing and financial option) would run between \$25,000 and \$30,000.

Digital Systems Corp. is at N. Main St., Walkersville, Md. 21793.

## Disk Controller For Apple IIs Holds 256K Bytes

GOLETA, Calif. — A disk controller board for Apple Computer, Inc. computers that is reportedly software-compatible with the Apple disk operating system and contains 256K bytes of on-board boot read-only memory (ROM) is available from Lobo Drives International.

The Lobo LCA-22 controls up to four 8-in., single- or double-sided, single- or double-density disk drives with a total storage capacity of 4.4M bytes, the vendor claimed.

Additional features include an average access time of 200 msec and a DMA designed for full 62.5K byte/sec transfer rate, a spokesman said, adding the product has been designed to run in slots 1 through 7 and is not restricted to a single location.

The price for the controller is \$699, the vendor said from 354 S. Fairview Ave., Goleta, Calif. 93117.

## Memory Module S100-Compatible

WESTLAKE VILLAGE, Calif. — Chrislin Industries, Inc. is offering a CI-S100 memory module that is compatible with most S100 bus microcomputers.

The dynamic random-access memory (RAM) module requires no wait states at two or four MHz. The CI-S11 can plug directly in to the memory slots of most S100 systems and can be expanded to .5M bytes with a bank select feature which allows selections of up to eight 64K-byte memory cards.

Addressable in 4K increments up to 512 bytes of memory, it is available with battery backup capability and costs \$575 from the firm's Computer Products Division, 31352 Via Colinas No. 102, Westlake Village, Calif. 91361.

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## Color Graphics Add-In Memory Designed for LSI-11/2 or 11/23

OAKLAND, Calif. — Peritek Corp. has introduced the Model VCG-Q, a direct-access color graphics add-in memory for the Digital Equipment Corp. LSI-11/2 or 11/23 microcomputer.

Packaged on one "dual-height" module, which plugs directly into the Q-Bus, this unit comprises all the hardware needed to connect the DEC equipment to a standard color or monochrome CRT terminal monitor and produce a color or gray-scale graphic image.

The VCG-Q frame buffer memory is accessed by the MPU in two different ways. The image can be accessed one raster line at a time through data registers located in the I/O page.

Alternately, the extended addressing capability of the LSI-11/23 can be utilized to address the entire frame buffer directly as 64K-byte words of memory. This method allows for rapid transfer of image data between the VCG-Q and disk, the vendor said.

The unit's 22-bit addressing allows the user to take advantage of the capabilities of the LSI-11/23, while still maintaining compatibility with the other LSI-11 processors.

The board's memory section can be set to any 64K-byte word boundaries within the 22-bit spacing, the vendor noted.

Price of the unit, in quantities of one to four, is \$2,200 from the firm at 3014 Lakeshore Ave., Oakland, Calif. 94610.

## Course to Apply Micros To Math, Science Studies

NEW YORK — The School of Education, Health, Nursing and Arts Professions at New York University is offering an intensive 12-day course, "Applications of Microcomputers to Mathematics and Science Instruction," designed for instructors and curriculum specialists of mathematics and science at the junior high through introductory college level.

The course will meet Monday through Thursday from

July 27 to Aug. 14 at 5:10 p.m. to 8:30 p.m. and its aim is to give students a working knowledge of a variety of microcomputers and an introduction to Basic programming language. The course carries three graduate credits and costs \$468.

More information about dates and times is available from Prof. Robert Sherwood, NYU, Science Education, Room 23, 32 Washington Place, New York, N.Y. 10003.

## First 16-Bit Memory Bows For Secs 86 Micro Family

CHATSWORTH, Calif. — Electronic Memories and Magnetics is offering the first 16-bit memory of the Severe Environment Computer System (Secs 86) family of Intel Corp. Multibus-compatible microcomputers.

The dual-board computer, designated Secs 86/05, features an Intel IAPX 86/10 microprocessor with a 5-MHz clock and accommodates the 8087 numeric data processor as an option.

The Secs 86/05 consists of two 6-by 9-in. ATR-compatible boards, one containing the various memory components and the second the processor and associated functions.

The product costs \$7,250, the vendor said from 20630 Plummer St., Chatsworth, Calif. 91311.

## Apple Cuts Clock

CUPERTINO, Calif. — Apple Computer, Inc. has announced it will no longer offer a special built-in clock/calendar circuit as part of its Apple III processors.

The firm has cut the price of the Apple III by \$50, and current Apple III customers will get a \$50 rebate.

A spokesman said the clock was eliminated because of component availability problems.

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## PC/M Adds Micro

DUBLIN, Calif. — Pacific Cyber/Metrix, Inc. (PC/M) has announced the PCM-12 Omega microcomputer system.

The unit features software compatibility with Digital Equipment Corp.'s PDP-8 family and a binary instruction set, the vendor said.

The Omega mainframe costs \$815 (in quantities of 10) and option modules cost between \$200 and \$300, the vendor said from 6800 Sierra Court, Dublin, Calif. 94566.

## Disk Drive Out For Q1 Microlite

HAUPPAUGE, N.Y. — Q1 Corp. has announced the Model 311, a micro-Winchester type disk drive for its Microlite microcomputer systems.

The 5.25-in. 5M-byte drive features a ferrite head and a recording speed of 7,500 bit/in., the vendor said. Options include a quad-density disk drive and a 64K-byte memory board.

The unit costs between \$4,000 and \$5,000, the vendor said from 125 Ricefield Lane, Hauppauge, N.Y. 11787.

## Interface Speeds Input to TI Units

SOUTHPORT, Conn. — Science Accessories Corp. (SAC) is offering a new version of the DC-59 Texas Instruments, Inc. programmable calculator interface which, it claims, represents the first nonkeyboard entry device for use with programmable calculators.

The new interface offered for use with TI's SR-59 or SR-52 hand-held programmable calculators was designed to simulate keyboard closures to allow more rapid digital data input.

Costing \$495, applications include navigation, mathematics and civil engineering problem solving. SAC is located at 970 Kings Highway W., Southport, Conn. 06490.

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LA 24	1095	198	65
LA 120	2495	330	135
VT 100	1795	187	85
Visual 100	1550	187	80
Visual 200	1050	180	60
GE 2030	1450	230	72
Diablo 1330 RD	2430	363	120
Diablo 1640 KSR	2925	363	160
Diablo 1650 KSR	2995	363	165
H.P. 2621 A	1595	187	85
H.P. 2621 P	2750	312	165
Memovue 2078	2552	198	79
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ADM-31	1370	285	75
ADM-5	965	180	55
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DATA ACCESS SYSTEMS, INC.

## Jury Probing Firm Charged With Breaking Trade Embargo

By Bill Laberis  
CW Staff

LOS ANGELES — Charges that a California company and several of its affiliates illegally shipped more than \$9 million worth of integrated circuits, computer manufacturing equipment and other high-technology products to the Soviet Union are being investigated by a federal grand jury here.

According to published reports and investigative sources, the probe is centered around Continental Technology Corp. of Redondo Beach, Calif., an apparently defunct firm. In a recent *Computerworld* article, Continental was described as the heart of a 22-firm, telex-linked network that allegedly bought computer manufacturing equipment and integrated circuits here for illegal export to the Soviets [CW, Feb. 9].

The Federal Bureau of Investigation, U.S. Customs Department and Santa Clara County Sheriff's Department have joined in the investigation, sources said. Their claims of wrongdoing are based largely on sei-

(Continued on Page 88)

## Consultant Says Sperry Forced Him To Rig Bids

By Bob Johnson  
CW New York Bureau

ALBANY, N.Y. — A former data processing consultant for Sperry Univac has sued the company for \$20 million, claiming he was compelled to rig bids for an upcoming Department of Social Services computer contract.

In the complaint filed in U.S. District Court here, Robert Gazit of Clifton Park, N.Y., claims Univac compelled him to "participate in a scheme and conspiracy to rig a request for proposal [RFP] for approximately 4,000 communication terminals."

Gazit said that he was expected to perform "illegal and unethical services" by using his skills and knowledge to misrepresent certain facts so that Social Services officials could tailor bid specifications for the new terminals "only for Sperry Univac products." The terminals would have been worth an estimated \$2.5 million a year to Univac.

Gazit, who resigned from his job last September, also claims that Univac informed him it had purchased or leased 60 to 200

(Continued on Page 88)

## Feds Investigating OPM Over Business Practices; Finance Fraud Alleged

By Tim Scannell  
CW Staff

NEW YORK — Federal investigators are probing one of the computer industry's largest equipment leasing firms for a number of alleged financing frauds, including the possibility that it obtained multimillion dollar loans by writing phony computer leases.

The U.S. Attorney's Office here launched the investigation against OPM Leasing Services, Inc. after several questions were raised about the firm's business practices. So far, at least three law suits have been filed by New York lending institutions claiming that the firm allegedly forged leasing documents made out to Rockwell International Corp. to obtain more than \$10 million in loans.

Shortly after word of the investigation and the law suits was made public, OPM filed for protection from its creditors under Chapter 11 of the Federal Bankruptcy Act. "A large number of early terminations of leases written by the company [have] caused a severe cash flow prob-

lem," the company's president, Mordecai Weissman, said in a release issued by the privately held firm.

"While the company believes it has substantial assets, it is not in a position to meet its current obligations as they come due," the release stated.

When reached here recently, officials at OPM declined to comment on the allegations or the federal investigation, noting that "at this point no one on the business side is permitted to discuss the situation."

For the most part, federal investigators are looking into the ways OPM set its leasing rates, which are reportedly lower and are written for longer time periods than competitors' leases. The U.S. Attorney is also investigating how the firm, which was not public and reportedly did not release any financial statements, received backing for millions of dollars in loans.

The law suits and the recent filing for bankruptcy have added more fat to the investigative fire. The suits, filed by Rhode Island Hospital Trust National Bank, Lincoln National Life Insurance Co., and Westdeutsche Landesbank Girozentrale, accuse OPM and its principals of securities fraud, breach of contract, common law fraud and misrepresentation. In all, the three suits are asking for nearly \$21 million in damages.

### Burden of Loss

However, the worst injuries could be suffered by OPM's customers, who are expected to handle the burden of loss if the leasing company folds. Although no one reportedly knows exactly how many customers the company represented, one leasing competitor estimated it to be within the half-billion- to billion-dollar range. This would mean

(Continued on Page 90)

## Report Expects On-Line Data Bases To Grow at 38% Through 1985

By Robert Batt  
CW Staff

SAN JOSE, Calif. — Revenues generated by on-line data base services will reach \$2.99 billion by 1985 with a compound annual growth rate of 38% over the next five years.

This is the major forecast just released by Creative Strategies International, Inc. (CSI), a California market research firm, based on an analysis of the on-line data base industry.

In its "Online Database Services" report, CSI said that a growing concern over professional and managerial productivity, improved software and an increasing number of data bases in a widening range of subject areas (over 450 data bases are currently on-line) will all contribute to rapidly developing markets in reference and source data bases.

CSI claimed that there are currently around 225 reference data bases with new ones coming on-line every month. But, it added, although some 3.5 million information searches were conducted through U.S. public institutions in 1980, surveys indicate that only 5% of this market has so far been tapped.

"There are literally thousands and thousands of companies who have the ability to access reference data bases, but do not know it," said Larry Wells, CSI president.

"The market is wide open for

innovative data bases with so many applications available, but at the moment many potential users simply don't know how to access their terminals to use such data and so more training is required on how to use data bases intelligently," he added.

Wells claimed that data bases were capable of providing answers to critical questions for executives in every function of business, particularly quantitative or bibliographic information contained in areas such as market and economic data and patent

searches.

Among those most frequently using data bases is the legal profession, which requires a large number of information searches to be carried out, and scientists and engineers who use data bases to find information such as the physical and chemical properties of components.

Wells explained: "These areas have advanced rapidly because it is easy to provide answers to virtually any question in a form which is intelligible to the user."

(Continued on Page 98)

### Prime Computer Tops NYSE

## Computer Stocks Outperform Market

By Bohdan O. Szuprowicz  
Special to CW

At least 30 stocks of major DP corporations that are listed on the New York Stock Exchange outperformed the average price rise of 25% during 1980 as measured by the exchange's own Composite Index and the Standard & Poor's 500-stock Index. The star of all the 1,527 stocks listed on the New York Stock Exchange, as ranked by *Money* magazine in its February issue, was none other than Prime Computer, Inc. whose stock price increased by 273% between Dec. 31, 1979 and Dec. 31, 1980.

In fact, among the top 10 stocks showing the largest price appre-

ciation in that period of at least 200%, four represented computer manufacturing companies. These included, besides Prime, Computer Vision Corp., Tandy Corp., and Cray Research, Inc.

For those who searched for relatively solid yet fast-growing investment vehicles within the computer industry in order to beat the annual inflation rate, around 15% during 1980, there were numerous opportunities, although not among the obvious industry giants.

IBM showed a relatively flat performance. At year end its stock price closed only 5.4% above the closing price for 1979. Of course IBM stock yielded also

5.1% in dividends while the stocks of the best performing computer companies are yet to start paying their first dividends.

But everything was not roses for the 50-odd computer stocks listed on the New York Stock Exchange. Burroughs Corp., the second largest computer supplier, actually declined 31.3% during 1980 and all trading in Intel Corp., only recently considered the 29th largest DP company, was suspended in December 1980 after declining 81% during the year. Other stocks of DP companies listed on NYSE that also declined during 1980 include Nashua Corp., United Telecom-

(Continued on Page 92)



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# Jury Probes Firm Charged In Breaking Trade Embargo

(Continued from Page 87)

zures made of allegedly illegal Continental shipments of embargoed high-technology goods bound for the Soviets.

## Left Country

Police believe that Werner Bruchhausen, a West German and former Continental executive, has left the country since the investigation began. Bruchhausen is said to have coordinated the alleged multimillion-dollar illegal trade, channelling illicit shipments through bogus "paper" companies he directed.

Russian-born Antoli Maluta, former Continental vice-president, has spoken with investigators and surrendered documents related to the company's activities, his attorney, Carl Anthony Capozzola, said.

"He [Maluta] hasn't been formally charged as such with anything, but authorities are looking into the alleged illegal exportation of controlled machinery," Capozzola said. "Mr. Maluta has denied any such allegation relating to him."

Capozzola said Maluta, in addition to being vice-president of Continental, was "associated with a few other companies."

He also said that Maluta had an association with Bruchhausen, but refused to say what the relationship was. Maluta has not yet been formally subpoenaed by the Grand Jury.

A spokesman for the Santa Clara County Sheriff's Department, whose

jurisdiction extends over much of Silicon Valley, said the department has been increasingly active in export control cases, especially those where the ultimate destination is the Soviet Union.

Federal law prohibits the sale of certain high-technology products without proper licensing, and in many cases forbids the sale altogether when the customer is a so-called Communist or unfriendly nation.

## Playing Catch-Up

"They're hot after integrated circuits, laser devices and the equipment needed to manufacture such products," department Lt. Robert McDiarmid said.

"We're discovering more of it now, but our feeling is that it's been going on for quite a while and we're just catching up."

McDiarmid believes that West Germany and Austria are the most oft-used third-party countries in illicit international trade of high-technology products.

He added that, by setting up numerous "post office box [paper]" companies, merchants can easily funnel embargoed goods to the Soviets and "simply fold operations when the heat is on."

The FBI, meanwhile, is looking into at least one case where it has forged a link between organized crime here and the theft and subsequent sale of embargoed goods to a Communist country, a source said.

# Sperry Accused of Forcing Consultant to Rig Bids

(Continued from Page 87)

minicomputers for him to install in Albany when in fact the company had not, and that his duties did not conform to the job description presented to him prior to employment.

## Univac Comment

Asked to comment on the complaint, a Univac spokesman said, "Robert Gazit was employed by Sperry Univac, a division of Sperry Corp., as a data processing consultant for the Sperry Univac Albany branch until September of 1980 when he resigned."

"Starting in August of 1980 Mr. Gazit wrote to and sought personal interviews with several Sperry executives. His purpose was to air numerous charges against Sperry."

"After evaluation of Mr. Gazit's information we concluded that no action was called for. Mr. Gazit said he would take his case to court. We have been informed that Mr. Gazit did commence an action on March 3, 1981 in U.S. District Court in Albany."

"Since the matter is now in court, we will follow our customary policy of not commenting further so long as the litigation continues," the Univac spokesman commented.

The lawsuit also accuses Univac of breaking its employment contract with Gazit and seeks \$10 million in compensation for lost earnings, career damage and related permanent health problems plus \$10 million in punitive

damages.

According to the state Department of Audit and Control, Univac — which won the contract for the Department of Social Services main computer in 1976 — will collect \$5.5 million this year from Social Services for a variety of equipment and services and has signed contracts with a dozen other state agencies since 1977.

The Department of Social Services is not a defendant in Gazit's suit, and it says it has no evidence of wrongdoing by its employees.

# Shugart Hikes OEM Prices

SUNNYVALE, Calif. — Shugart Associates has made a 5% average price hike on its floppy- and fixed-disk product lines, effective immediately on all new OEM agreements as well as on purchase orders.

According to George Sollman, vice-president of marketing, "Like many companies in the electronics industry, Shugart is feeling the pressures of inflation in both labor and materials costs and we have adjusted prices accordingly."

Sollman noted that although Shugart reviews its price structure annually, the company has had only one price increase since the company was formed in 1973.

## Supershorts

Southern Pacific Communications Co., which was recently awarded two domestic communications satellite slots by the Federal Communications Commission, has formed the Spacenet Division to handle satellite-related activities. Headquartered in McLean, Va., Spacenet will be responsible for the acquisition, launching and operation of the satellites.

The Semiconductor Group of Motorola, Inc. and a team of Signetics Corp. and N.V. Philips have jointly announced an agreement under which Signetics and Philips will alternate-source Motorola's M68000 microprocessor family in a technology exchange.

United Information Systems is entering the data communications market by going public with its Uninet communications network. The move establishes Uninet as the nation's third largest commercial digital communications network, the vendor said.

Rolm Corp. and Compath have announced a transition agreement which provides long-term support of Rolm products for Compath and its customers and permits Rolm to begin marketing directly in California.

New World Computer Co., Inc. reported the Kanematsu-Gosho (U.S.A.) Inc., an international manufacturing and trading company, has notified the company that it intends to enter into a licensing agreement for the manufacture and marketing of its Micro Disc product line.

Mead Data Central and Matthew Bender Co. have agreed to develop a product that will enable lawyers to use interactive computerized legal practice systems. Mead Data Central, a division of the Mead Corp., and Matthew Bender, a subsidiary of The Times Mirror Co., will develop and distribute a number of computer-assisted legal practice services. Matthew Bender will produce editorial packages, which will be stored on Mead Data Central's computers.

Evolution Computer Systems Corp. and Solar Farm Industries, Inc. (SFI) have jointly announced that an agreement and plan of reorganization has been signed by representatives of the two companies. Evolution will now become a wholly owned subsidiary of SFI.

Formation, Inc. has opened its first European branch in Brussels, Belgium.

Qume Corp. has signed its first nationwide industrial distributor agreement with Schweber Electronics of New York. All Qume terminal products and floppy disk drives will be sold by Schweber.

MFE Corp. will stop manufacturing

8-in. flexible disk drives. As part of this decision, MFE will close MFE Limited, its flexible disk drive manufacturing plant in Scotland. MFE will take steps to continue servicing the European customer base.

AM Jacquard Systems, Inc. has established a nationwide network of software houses to expand installation of its "Account-Rite" business application program.

Harris Corp.'s Data Communications Division recently combined its manufacturing and product assurance departments into one operations department.

## Xerox Organizes Peripherals Unit

STAMFORD, Conn. — Xerox Corp. has formed Xerox Peripheral Systems to coordinate the activities of four company units, which primarily supply computer-related products to other manufacturers.

The new organization will be headquartered in Santa Clara, Calif. Operating under it will be Century Data Systems, Inc., Anaheim, Calif.; Diablo Systems, Inc., Hayward, Calif.; Shugart Associates, Sunnyvale, Calif.; and Xerox Magnetics, San Jose, Calif.

William T. Bayer, former president of the Peripheral Equipment Group of Memorex Corp. in Santa Clara, has been named president of Xerox Peripheral Systems.

## DG Lays Off

WESTBROOK, Maine — Because of a continued slowdown in orders, Data General Corp. has announced layoffs of 230 people at its manufacturing plant here.

The action is part of an ongoing reduction in hiring and overtime and cuts in overhead expenses that have been made throughout the company in the past six months to reduce costs and adjust production levels, the firm said. The move will allow the company to reduce its inventory to computer products and bring its manufacturing output in line with market demand.

The Westbrook plant manufactures subassemblies for systems, including peripheral equipment, wires, cables, metal frames and chassis. Cuts in the 900-person work force at the plant were made on the basis of seniority.

## TELEX SERIES 80: THE BEST TAPE DRIVE FOR 4300 SERIES PROCESSORS.

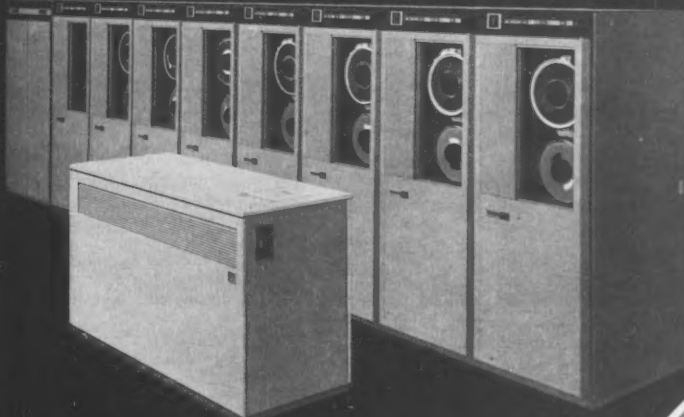
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# OPM Charged With Fraud, Phony Leases

(Continued from Page 87)

that customers would have to foot "a minimum of \$100 million to a quarter of a billion dollars" in losses with present leasing arrangements, Michael O'Connell, executive vice-president of Comdisco, Inc., said.

Investigators are also reportedly scrutinizing certain "side agreements" allegedly made by the company with customers which would allow them an easy out if the computer did not maintain a substantial remark value throughout the length of the leases. Most OPM leases were written for lengths of seven or even eight years as opposed to the usual two- to four-year periods.

Although details of the closely held company are sketchy, it is believed

that the company got itself into financial hot water because of the type of computer equipment it leased, namely, IBM 370 machines.

During the past few years, the value of 370-type machines has dramatically nosedived due to the introduction of the more advanced IBM 3033, 4300 and 3081 mainframes.

The situation became even more financially disastrous when IBM announced price cuts on the 3033, which is now selling for about 90% of its retail cost, according to estimates of the Yankee Group. Following these price cuts on newer computers, the costs of the 370-type machines plummeted to about 5% or 10% of their original selling price.

Although OPM's long lease lengths

are unusual, it is not an unheard-of practice in the leasing business. In fact, lease lengths are probably the single most important factor in the extremely speculative leasing game, according to George Heilborn, president of the Computer Dealers and Lessors Association.

## 'Business Risk'

"It's a business risk you take," Heilborn explained. "You try to write leases whereby you recover the value of the equipment, plus make a profit. If you're right, you make money." But, "if you're wrong, you have a loss situation on your hands," he noted.

Recently, the 140 members of the Computer Dealers and Lessors Association voted against letting OPM join

the ranks of their organization. Association President Heilborn declined to elaborate on the membership denial except to say that it was decided by a secret ballot.

"Apparently, a sufficient number of members (less than two-thirds) felt that they were not eligible for membership," Heilborn said. "The members made up their minds on what they felt individually about the company."

## Insurance Coverage

Federal investigators are currently interested in how OPM would get the money to recoup losses or stay afloat if its long-term lease speculations did not pan out.

Most of today's leasing firms, including OPM, work through banks and other financial institutions that provide computer-buying capital. A few firms even back their leasing speculations with insurance policies, such as the so-called "J" policies offered by Lloyd's of London from 1974 to 1977, that cover extreme financial losses.

However, even insurance protection can be risky, as Lloyd's found out a couple of years ago when it was caught off-guard by plummeting hardware prices and severe reductions in lease rates [CW, April 23, 1979]. Today, Lloyd's and other insurance backers are walking with considerably more care in the technological progress jungle.

When OPM filed for bankruptcy recently, it listed its total assets as \$446.1 million and total liabilities of \$504.6 million. Among its liabilities were \$475.3 million for discounted rentals and equipment purchase obligations.

The current federal investigation launched against the New York-based leasing firm is not the first time that OPM has been under the investigative gun.

Last March, the firm pleaded guilty in federal court in New Orleans to 22 counts of check-kiting — drawing checks at one bank and cashing them at a second even though funds were not available to cover the checks in the first bank.

OPM was given the maximum fine of \$110,000.

Besides a main office in Manhattan, the firm has 11 branches throughout the U.S.

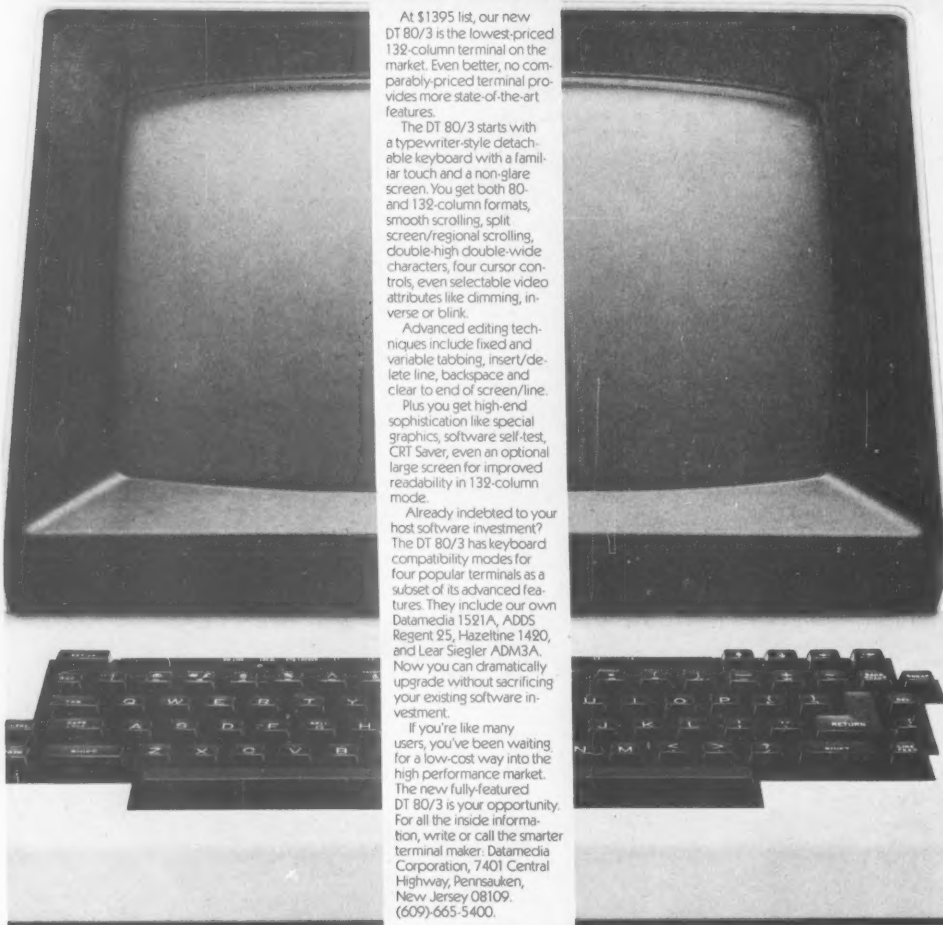
## Report Covers Bell, FCC Procurement

MILLBURN, N.J. — Recent Federal Communications Commission (FCC) actions regarding policy changes in the Bell System procurement could undermine the validity of the Computer Inquiry, have a negative effect on the antitrust settlement or legislation, as well as other far-reaching effects, according to a 55-page report by Probe Research, Inc.

The Probe report explained and analyzed the FCC's new proposals for Bell procurement. It puts FCC procurement actions into historical perspective, including the fate of the earlier "Entity" proposal and also discussed how information needs of outside suppliers are handled.

The report, entitled "Bell Procurement: The Meaning of the New FCC Policies" is available for \$130 from Probe Research, P.O. Box 251, Millburn, N.J. 07041.

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## Mergers/Acquisitions

**Electronic Data Systems** has acquired **Centurion Computer Corp.** of Richardson, Texas.

**Dyatron Corp.** has acquired the outstanding common stock of **Computech Financial Services, Inc.**, a wholly owned subsidiary of First Pennsylvania Bank for \$400,000.

**Computer Consoles, Inc.** has acquired all of the outstanding shares of **RLG Corp.** of Reston, Va. RLG's stockholders received 45,000 shares of CCI common stock in exchange for all of RLG's stock.

The chief executive officers of **Vector General, Inc.**, Woodland Hills, Calif., and **Ferranti**

### IBM Employees Face Drug Charge

NEW YORK — Two employees of IBM's General Systems Division branch office in Iselin, N.J., and a former head of the IBM Office Products' Trenton, N.J., branch were among 11 people indicted on federal drug smuggling charges here last week.

A grand jury in Federal District Court in Brooklyn indicted Douglas Gannon, the 31-year-old administrative manager at the Iselin, N.Y., branch and Richard Schubella, also 31, an administrative clerk at the branch. Also indicted was George Brenn, retired head of the Trenton branch.

According to officials, they were part of an international drug smuggling ring which reportedly smuggled millions of dollars of cocaine into the U.S. by air and sea.

Federal agents from Florida and New York raided a motel room near Miami International Airport and arrested Gannon and Schubella as well as eight others and seized eight pounds of cocaine, nine guns and \$30,000 in cash.

The raid resulted from a Federal Bureau of Investigation probe by New York City agents who were investigating a gang dealing in stolen securities and traveler's checks.

IBM declined to comment on the situation, saying it considered it a police matter.

**Cetec Graphics Ltd.**, Edinburgh, Scotland, will be elected to each other's board of directors. In an allied cash transaction, **Ferranti** has acquired a 14% shareholding position in **Vector**.

**Elec-Trol, Inc.** has announced the acquisition of **Liton Mellonics Information Center** as sole vendor for all of its corporate data processing requirements.

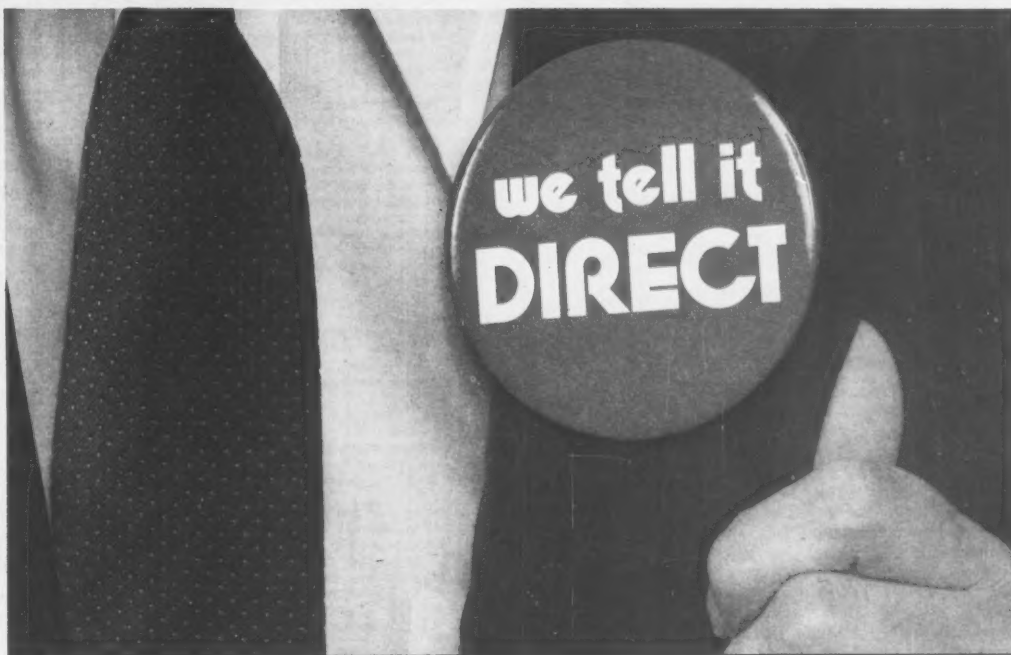
The **David Jamison Carlyle Corp.**, a terminal distributor, and **Buckingham Motor Imports Ltd.** announced that the merger between the two companies has become effective as of Feb. 28. Under the terms of the agreement, **Buckingham** is changing its name to the **David Jamison Carlyle Corp.** The present board of directors of **DJC** will become the executive officers and directors of the newly merged company.

## Memorex Reshuffles

SANTA CLARA, Calif. — In a move designed to focus greater attention on large disk drive manufacturing and mini disk drive sales, **Memorex Corp.** has replaced its Peripheral Equipment Group with the new **Storage Equipment Operations**.

The restructuring affects two of the former peripheral group's major line functions: disk drive operations and OEM marketing, company Chairman C.W. Spangle said. The changes followed the resignation of former group President William T. Berry.

William R. Krehbiel has been appointed vice-president of the new group and he will preside over the managers of the mini and large disk drive divisions and manager of component manufacturing.



## Some straight talk about computer terminals

The last official count identified 256 companies marketing display terminals. One of every four terminals brought to market in the past ten years has been discontinued. Makes it pretty tough on someone who's responsible for making the company's terminal buying decisions. Like, whom do you believe and who will be around tomorrow to talk to?

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# Computer Stocks Outpace NYSE Mart in '80

(Continued from Page 87)

munications, Inc., Management Assistance, Inc., Memorex Corp., Compugraphic Corp., Northern Telecom, Inc. Four-Phase Systems Corp., Data Terminal Systems, Inc. and Centronics Data Computer Corp.

It is clear that some specialized segments of the computer industry have much better prospects than others and this reflects on the performance of the stocks of companies involved in those markets. Good prospects for very large scientific computer manufacturers are to a large degree responsible for the outstanding performance of Cray Research, whose stock rose 200% in 1980, and may also affect Control Data Corp. in the future because earnings growth of up to 35% are expected in this industry sector.

Prime, which is supplying specialized small systems and whose sales have skyrocketed to \$260 million in 1980, is operating in a market segment that is expected to continue its rapid growth at 50% to 70% per year. Already Prime has competition in the form of companies such as Tandem, Computers, Inc. and Magnuson, Computer Systems Corp., but it also has the added prestige of being listed on the New York Stock Exchange.

## High Performers

There are, in fact, many other computer company stocks that may have shown good price performance in 1980, but those are traded on American Stock Exchange or on Over-the-Counter markets and are considered more speculative as a rule. The big institutional investors in the U.S. and abroad prefer NYSE-listed companies that are widely held, and by virtue of their listing must disclose more information about their operation than companies whose stocks are traded on other exchanges.

This is also the reason why Wall Street security analysts are always looking at companies like IBM, Honeywell, Inc., NCR Corp., Sperry Univac, Digital Equipment Corp. and Data General Corp. These are the market leaders in terms of global market shares and provide excellent yardsticks to measure the performance of the newcomers or specialized market sup-

COMPUTER STOCKS LISTED ON NEW YORK STOCK EXCHANGE

Rank Among NYSE Stocks In 1980	Rank in EDP Sales In 1979	Corporation Name	Change in Stock Price Dec. 31, 1979-1980
1	38	Prime Computer	+ 273.8%
5	54	Computervision	+ 219.6%
6	39	Tandy Corp.	+ 216.0%
10	67	Cray Research	+ 203.7%
17	59	Wyly Corp.	+ 172.9%
42	56	Recognition Equipment	+ 141.2%
50	26	Datapoint	+ 129.3%
62	24	Rolm Corp.	+ 120.8%
135	32	Tymshare	+ 88.4%
136	63	Modular Computer	+ 87.3%
151	42	General Instrument	+ 82.4%
155	79	Electronic Memories	+ 81.8%
185	37	Ampex	+ 74.7%
219	57	Comdisco	+ 68.9%
226	33	Perkin Elmer	+ 65.5%
232	36	Raytheon	+ 64.2%
261	28	Harris Corp.	+ 58.6%
284	13	TRW	+ 58.0%
311	8	Hewlett-Packard	+ 51.4%
390	29	Mohawk Data Sciences	+ 42.3%
405	16	Automatic Data Processing	+ 41.4%
431	48	Planning Research	+ 38.3%
436	8	Digital Equipment	+ 37.8%
448	14	Texas Instruments	+ 37.2%
458	62	Hazeltine	+ 36.2%
466	25	McDonnell Douglas	+ 35.3%
473	7	Honeywell	+ 34.2%
517	11	Storage Technology	+ 30.2%
518	4	Control Data	+ 30.0%
573	5	Sperry Corp.	+ 25.5%
618	18	Electronic Data Systems	+ 22.0%
623	53	Telex	+ 21.9%
655	10	Data General	+ 20.0%
782	91	Electronic Associates	+ 12.5%
800	3	NCR	+ 8.3%
907	1	IBM	+ 5.4%
975	30	Tektronix	+ 2.1%
977	15	Computer Sciences	+ 2.0%
1275	90	Nashua	-10.6%
1323	43	United Telecommunications	-12.7%
1431	22	Management Assistance	-22.1%
1475	9	Memorex	-28.7%
1476	-	Compugraphic	-29.0%
1486	2	Burroughs	-31.3%
1494	20	Northern Telecom	-33.7%
1514	31	Four-Phase Systems	-43.8%
1522	93	Data Terminal Systems	-53.1%
1523	45	Centronics Data	-55.4%
-	27	Itel Corp.	-81.0%

NYSE Ranking of Industry Stocks

pliers. Although most are solid dividend-paying investment vehicles, those companies are also large corporations that cannot grow as fast as some of the smaller firms in specialized areas.

The major mainframe manufacturers are expected to experience earnings

growth of only 7% to 15% during 1981. The leading minicomputer firms can do a little better, probably increasing their earnings by 15% on the average. Peripheral equipment manufacturers may show even better gains in the 15% to 20% range, but it remains to the specialized sectors to provide the more than 20% growth that ensures staying ahead of the inflation levels with a reasonable margin of safety.

Computervision, the second best performing DP industry stock that increased in price almost 220% was also the fifth best performer on the whole New York Stock Exchange in 1980. The company manufactures interactive graphics design systems of particular value for increasing productivity in such complex areas as integrated circuit design, electrical schematics, maps, numerical controls, structural, piping and architectural drafting. Tandy, the third best computer-related stock, showed a 216% increase in its stock price and was followed by Recognition Equipment, Inc., Datapoint Corp., and Rolm Corp., all of which increased in price over 100%.

The relatively little-known Rolm is the supplier of "ruggedized" minicomputers based on DG's Nova and Eclipse hardware. It serves the military and aerospace markets and the expected expansion of Western military budgets during the Reagan adminis-

tration is almost a guarantee of growing markets for Rolm with relatively little competition. From the investment point of view this company combines high technology with defense market advantages.

The military segment is also supporting the growth of very large-scale integration (VLSI) technology, which in fact leads to the production of super-fast custom-designed special-purpose microcomputers. Modernization of military forces, particularly in satellite surveillance systems, electronic countermeasures, high-energy laser weapons, and secure command, control and communications, is a good incentive to develop VLSI technology rapidly despite high research costs and intense competition from Japan.

Companies that will provide or use VLSI technology are well in line to become the darlings of the computer industry in the future. One such firm that has been formed recently in California is VLSI Technology, Inc. As yet it is a restricted investment vehicle as a new venture to produce custom-designed VLSI logic circuits, although it has impressive financial backing. A new era of spin-offs based on VLSI technology may be just beginning, but it will be a few years before the leaders will be listed on the New York Stock Exchange.

## Software & Services

Besides hardware manufacturers there are also about 10 large computer software and service companies that are listed on the New York Stock Exchange. Wyly Corp., whose better known University Computing subsidiaries provide computer services in several countries, was the fifth best performer among DP stocks, also ranking seventeenth best performer among the NYSE stocks in 1980. Tymshare, Inc., the global time-sharing network, jumped by 88% and Comdisco, Inc., billing itself as the largest second-hand computer trader in the world, also registered a healthy 69% stock price increase. Automatic Data Processing, Inc., Planning Research Corp., and Electronic Data Systems Corp. posted stock price increases above 20% for 1980. Computer Sciences Corp., one of the oldest and best known DP service organizations, was not among the best performers, its stock showing only a modest 2% increase at year end.

The international situation and the new mood in the U.S. with the advent of the Reagan administration combine for great expectations among venture capitalists and traditional investors who are looking for new ways to increase productivity. Many computerized systems offer the best opportunities of achieving those goals.

Additional capital investment incentives in the form of reduction of capital gains taxes in the U.S. may soon accelerate the innovative spirit even further among American industries in general and several sectors of the computer industry in particular. Large initial markets for new products and systems presented by the North American continent will also attract capital and applicable technology from other industrialized countries that do not offer big enough markets within their own borders to justify risking large funds in these industries.

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software, books and marketing programs for the computer retailer.

This integrated line of logically related products gives the Ohio Scientific dealer a competitive edge over retailers who must rely on one narrow market segment for sales, or dealers who try to contend with dozens of vendors in an attempt to address all the market segments necessary for profitable computer retailing.

### Software.



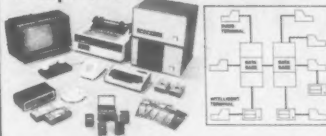
Most small computer vendors rely on someone else to come up with software. We don't. Ohio Scientific currently offers its dealers over 380 distinct software products ranging from animated cartoons for preschoolers to fully integrated accounting systems for multi-user and distributed office systems.

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### Good Delivery.

Quite frankly, we have had problems keeping up with the rapid growth in demand in the past. But since July of 1979, Ohio Scientific has been able to keep up with dealer demand. In addition, we have just added a new plant which will nearly double our capacity to ensure continued good deliveries in the future. Ohio Scientific products are also backed by several regional stocking distributors.



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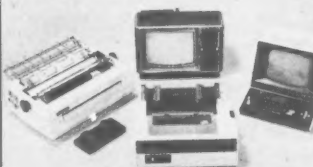
Most Ohio Scientific computers are based on a modular, BUS-oriented architecture which is easily expanded by simply plugging boards in. Ohio Scientific accessories range from plug-in analog data acquisition systems for process control and laboratory applications to joysticks for computer games. We offer our dealers the accessories for every market that the computer retailer should address.

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### Support and Documentation.



Ohio Scientific is the first company to have its full line of computer products documented by Howard Sams, Inc., the originators of the Sams Photofact series of consumer electronics service documentation. Ohio Scientific offers factory training in sales, software support and field service. Certain courses are now required for some classifications of dealerships.

For more information concerning computer retailing in the 80's, send the attached form along with your business card to:  
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Phone \_\_\_\_\_ Years in business \_\_\_\_\_  
Principal product/service \_\_\_\_\_



## Executive Corner

• James M. Bridges has been appointed acting general manager of Stromberg-Carlson Corp., a subsidiary of General Dynamics Corp.

• Alfred C. Peak has been named manager of major systems support, data services, for the RCA Service Co.

• Michael A. Backler has been appointed manager of product marketing for Nixdorf Computer Corp.'s compatible information systems

product lines.

• Desmond F. Sheahan has been named vice-president of engineering at GTE Microcircuits Division. Larry Walker has been named director of operations; George Fry, director of assembly and packaging; James C. Nord, director of product marketing and sales; and F.L. Krch, director of strategic marketing and planning.

• Robert L. Goodwin has

been appointed president of Friday Computers, Inc.

• Robert W. Tillson has been named president of BIS Federal Sales, Inc., a subsidiary of Business Information Systems, Inc. Joseph P. O'Connell has been named district manager of Business Information System's branch office in Pittsburgh.

• Robert J. Riopel has been appointed vice-president of finance and administration for

ASK Computer Systems, Inc.

• Douglas G.G. Levick III has been named senior vice-president of finance at Am-dahl Corp.

• Bob Stewart has been named vice-president of operations at Intecom, Inc.

• Jonathan L. Schleifer has been appointed vice-president of accounting for Executone, Inc.

• Sidney T. Schell has been elected vice-president for

Floppy Disk Operations at Micropolis Corp.

• Patrick J. Messerich has been named vice-president of national marketing at Analysts International Corp. Michael C. Scorggie has been named vice-president of the Computer Products Division and George E. Sundem has been named vice-president of public relations.

• R. Stephen Fisher has been named vice-president and general manager of the Direct Response Division of NLT Computer Services Corp.

• Douglas Fonner has joined Software Pursuits, Inc. as vice-president of marketing and administration.

• Jim Brown has been promoted to vice-president of marketing and sales at Wabash Tape Corp.

• Anthony Holbrook has been named senior vice-president of operations at Advanced Micro Devices, Inc. George Scalise has been named senior vice-president of administration and Richard Previte has been appointed senior vice-president of finance. Maurice Chidlow has been designated vice-president of the newly created Bipolar Memory Division and Gene Conner has been named vice-president of Bipolar operations.

• Joseph A. Walsh has been appointed vice-president of corporate development and planning at Shasta General Systems. Robert C. Coolidge is joining Shasta as vice-president of marketing.

• Charles Hancock has been named vice-president of manufacturing for Symbol Technologies, Inc.

• Paul Siegert has rejoined Systems Management, Inc. as vice-president of administration.

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Apr. 27-01 Ottawa	
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SAN JOSE, Calif. — A high-technology-based financial support services company specializing in leasing programs for new manufacturers in advanced markets has been formed here.

Western Technology Investment, Inc. (WTI) will support selected manufacturers with complete lease programs as well as advise them on the financial aspects of marketing, a WTI spokesman said.

The company will pay particular attention to manufacturers in the fields of productivity improvement, communications, energy and health care, the spokesman added.

WTI is located at 1792 Technology Drive, San Jose, Calif. 95110.

**Systems Network, Inc.** has been formed to distribute computer software to vertical markets throughout the U.S. The new company will specialize in IBM GSD product software and is located at 3030 South 9 St., Kalamazoo, Mich. 49009.

**Concord Data Systems, Inc.** has been formed from Miller Associates and will specialize in the design and manufacture of advanced high technology data communication products for use in both local and distributed data networks. The corporate headquarters is located at 430 Marrett Road, Lexington, Mass., 02173.

**World Computer Works, Inc.** has been established to provide hardware

## New Companies

technical services. The firm specializes in the installation/deinstallation of IBM and IBM-compatible systems, features, and I/O. It is headquartered at 3830 Anjou Lane, Hoffman Estates, Ill. 60195.

**Architecture Technology Corp.** has been formed to specialize in the systems aspects of local computer networks. The new company is located at 4623 Drexel Ave. S., Minneapolis, Minn. 55424.

**Onecom, Inc.** has been founded to design and manufacture innovative products for the new telecommunications carriers and for communications end users. The company's initial product is a high-performance echo control

device for long-distance telephone channels. Onecom is located at 5735 Arapahoe Ave., Boulder, Colo. 80303.

**Composite, Inc.** is a new company specializing in the total site planning and development of computer room spaces with a special emphasis on computer power requirements. Composite is located at 1500 E. 79 St., Bloomington, Minn. 55420.

**Aeberhard & Partners Ltd.** is a new company specializing in providing public relations and general communications services to the computer and electronics business. The address is 138 Brompton Road, London SW3 1HY, England.

**GSC Co.** is a new consulting firm engaged in third-party software for the specialized needs of Hewlett-Packard Co. 1000 users. The company is located at 670 Essington, Buffalo Grove, Ill. 60090.

**Advanced Technology Educational Systems** is a new company marketing its first in a series of technical reports designed to serve electronics and computer science personnel who wish to enhance their professional competence without engaging in long-term training programs. The company is located at Suite 1519, 4615 N. Park Ave., Chevy Chase, Md. 20015.

**Symbicon Associates** is an export management company formed to concentrate on computer-related products including industrial control and instrumentation products based upon U.S. microprocessor technology. The company will assist high technology U.S. electronics manufacturers develop overseas sales. The company is located at 17 Airport Road, Nashua, N.H. 03063.

**Iconica, Inc.** has been established to specialize in applied computer graphics. The company evolved from Planning Systems, a consulting partnership. Iconica is located at Suite 200, 5332 College Ave., Oakland, Calif. 94618.

**Geographic Systems, Inc.** has been established to produce computer-generated statistical maps for business and government. Geographic Systems is located at 100 Main St., Reading, Mass. 01867.

**Tarrtec** is a new engineering firm providing services for investigative engineering and analysis; feasibility and planning; engineering design and development; implementation and control; and management support. Tarrtec may be reached through P.O. Box 81, Commack, N.Y. 11725.

**Computer-Ease, Inc.** has been formed to provide software consulting and programming services, including locating computers and existing software. Computer-Ease is located at Suite 222, 5725 Buford Highway, Atlanta, Ga. 30340.

**New Media Graphics Corp.** has been founded to develop systems utilizing videodisks, microprocessors and computer graphics displays. The company is located at 139 Main St., Cambridge, Mass. 02142.



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Cincinnati, OH	June 10
Cleveland, OH	May 21
Columbus, OH	June 10
Dallas, TX	April 28
Denver, CO	July 8
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Detroit, MI	May 22
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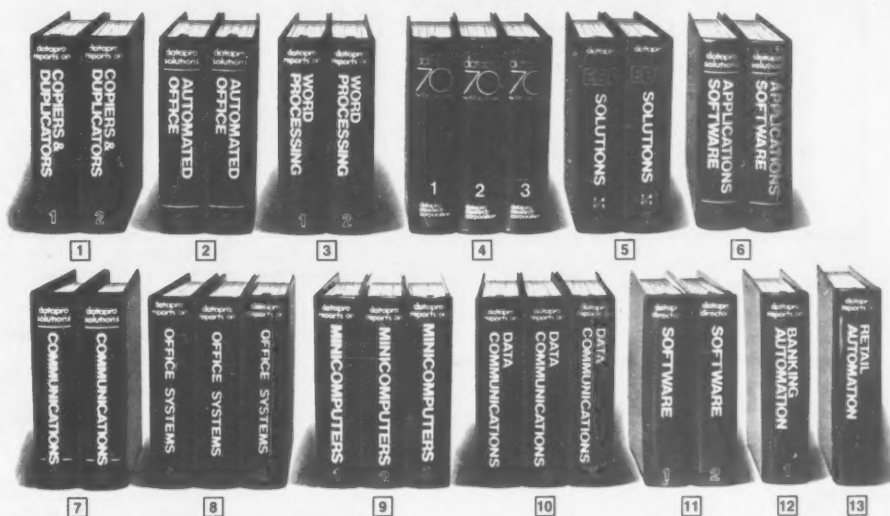
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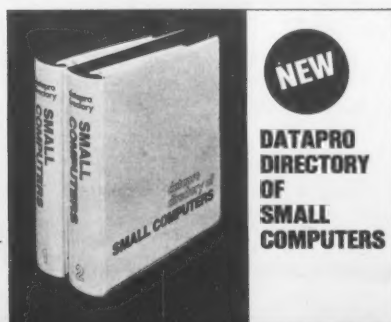
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# Report Expects 38% On-Line Data Base Growth

(Continued from Page 87)

On the other hand, businesses which are market-data-oriented, where data changes rapidly and where quantitative information doesn't necessarily mean that much — these have been more resistant to using data bases. In this category you could include many of the equipment vendors."

Wells said that there are a number of factors that have contributed to the low market penetration of data bases to date. Except among the top 500 U.S. corporations there was a lot of ignorance about what data bases could do for a

business.

"While the potential user is vaguely aware of data bases he doesn't really know the specifics and, generally speaking, users are waiting for the data base services industry to come to them," he said.

He claimed that so far the data base companies have concentrated on skimming off the easy 5% of the market. They tended to be low-capitalized, low-investment concerns without the resources available for widespread market penetration.

Nevertheless, Wells said, market prospects were bright

as large corporations began to use data bases more intensively, followed over the longer term by extensive use of data bases in the home for such applications as restaurant menu retrieval, travel and vacation planning.

As a result of these developments, companies already well-established in the field, such as Data Resources, Inc., System Development Corp. and Bibliographic Retrieval Services, Inc., would grow to sizable proportions.

## Source Growth

Although CSI forecasts a 27% increase per year for reference data bases from \$65 million worth of revenue to \$220 million, by 1985 it will be the source segment of the market which is likely to receive the strongest boost over the next few years.

CSI predicted that revenues from this sector will grow by 37% per year from the present \$567 million market to \$2.8 billion by 1985.

The report added "the fastest growing area within the source segment is the numeric data base, which is often used by the decision maker without the intervention of intermediaries. Although 89% of numeric revenues are from business and economic data bases, new data base acquisitions will broaden the range offered."

CSI claimed that source data bases lend themselves to much more extensive use than reference data bases because, unlike the latter, supplementary questions can be asked of the source data. Consequently, there is much more room for expansion.

With the rapid growth of econometrics and financial modeling techniques, numeric data bases would account for a greater proportion of users' investment in data bases, particularly since source bases could cater for the different needs of individual operations within a company.

CSI concluded its report by stressing that one of the big-

## Clapp & Poliak To Show Software

NEW YORK — Clapp & Poliak, Inc. has announced that its Information Management Exposition '81 will offer an additional feature, a Software and Applications Center.

The center will put vendors offering software and applications in one central section of the New York Coliseum, where the show is scheduled Oct. 12-15. Formerly, software vendors were mixed in with hardware vendors.

Booths in the software center will cost \$1,250 for an 8- by 10-ft booth, Clapp & Poliak said from 245 Park Ave., New York, N.Y. 10167.

## Data Base Industry Made of Four Groups

SAN JOSE, Calif. — There are currently four major groups that participate in the on-line data base industry — data base producers, on-line service organizations (vendors), integrated services and users.

According to Creative Strategies International, Inc. (CSI) there are some 270 producers and vendors in the industry, scattered across the U.S., Canada and Europe. While some overlap between source and reference vendors is evolving, other companies such as general time-sharing firms have found they can be very successful by packaging data base use with other services.

Larry Wells, president of CSI, claimed the data base vendors have been selling themselves short and have been outmaneuvered by these time-sharing distributors. He maintained that in an effort to break into markets — any markets — vendors have been cutting back on their profit margins to such an extent that their survival is threatened.

"Undoubtedly the people making most money are the time-sharing companies — the distributors of data bases — rather than the vendors. The money right now is not in providing data, but in distributing it," he explained.

Wells argued that data base vendors will need to increase their profit margins and choke off, to a certain extent, the profits of distributors. "Vendors have been willing to write contracts that resulted only in break-even situations or possibly even loss-making ones because they were too eager to get the data bases out onto the market rather than making profits from them. But slowly vendors are coming to realize that the big time-sharing bureaus do not provide as great a marketing service as they were led to believe. The vendors still end up doing most of the marketing and in this sense they have been outmaneuvered," he added.

gest problems facing the data base industry is the need to develop search methods that are easier for users to employ. Differences in current software programs stem from the wide variety in data bases themselves.

CSI said that prompting techniques on terminals are the most likely answer to the problem, and will be used extensively over the next few

years. But for all the difficulties, the report said, on-line retrieval will remain dominant for at least five years, despite the emergence of rival technologies such as videodisk and viewdata.

"Online Database Services" is available for \$1,200 from Creative Strategies International, Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129.

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## Nickels & Dimes

**Computer Task Group, Inc.** has filed a registration statement with the Securities and Exchange Commission for an offering of 300,000 shares of common stock. An additional 120,000 shares are being offered by certain selling stockholders. The company intends to use the proceeds of the offering for repayment of bank indebtedness, working capital, general corporate purposes and possible future acquisitions.

\$\$\$

**Beehive International** has registered a proposed public offering of 559,000 common shares with the Securities and Exchange Commission. The company is selling 500,000 shares, and 59,000 shares are being sold by existing shareholders. Proceeds will be used to repay short-term bank debt and to provide funds to Beehive's Irish subsidiary.

\$\$\$

**National Semiconductor Corp.'s** earnings for the third quarter ending March 8 are expected to be well below the same quarter of fiscal 1980, the company announced.

\$\$\$

**Emulex Corp.** has filed a registration statement with the Securities and Exchange Commission to make an initial public offering of its common stock. Of the total 742,869 common shares to be offered, 425,713 shares will be sold by the company and the balance by present shareholders. A portion of the proceeds from the company's shares will be used to repay bank debt incurred for working capital and to acquire capital assets for completion of the company's capital equipment and leasehold improvement programs.

\$\$\$

**General Datacomm Industries, Inc.,** is now listed on the New York Stock

## Two-Day Brief To Cover Effects Of Fira on Firms

NEW YORK — A two-day briefing on the Foreign Investment Review Act (Fira) and its effect on firms investing in Canada will be presented here April 30 and May 1 by the Institute for Science and Public Affairs.

The program will include topics such as Canadian Viewpoints on Foreign Investments, Background of the Fira and How to Benefit from "Winners" and "The Losers" — Real Life Case Studies.

Cochairing the seminar will be Robert J. Stocks, Esq., former deputy director of the compliance branch of the Canadian Foreign Investment Review Agency; and John A. Swift, Esq., a partner at Gottlieb, Kaylor, Swift and Stocks, which represents a number of U.S.-based corporations in connection with their exports to and investments in Canada.

The sessions are being held at the New York Hilton, Ave. of the Americas at 53rd St. For further information on registration, those interested may contact the Institute for Science and Public Affairs, 1370 Ave. of the Americas, New York, N.Y. 10019.

Exchange as "GDC." The company listed 6.5 million shares of common stock, which have been traded for the past nine years on the over-the-counter market.

\$\$\$

**Time and Space Processing, Inc.** recently acquired \$600,000 from Capital Management, a venture capital firm, to support TSP's introduction of digitized voice systems into commercial markets.

\$\$\$

**Gerber Systems Technology, Inc.,** a wholly owned subsidiary of Gerber Scientific, Inc., has filed a Registration Statement with the Securities and Exchange Commission providing for an

initial public offering of 600,000 shares, or approximately 20% of its common stock.

\$\$\$

**CGA Computer Associates, Inc.** has filed statement with the Securities and Exchange Commission to register for sale 1,050,000 shares of common stock to be sold principally by the stockholders of Allen Services Corp., which received the CGA shares on the acquisition of the assets and businesses of Allen Services.

\$\$\$

**Management Science America, Inc.** has filed a registration statement with the Securities and Exchange Commission in connection with a proposed ini-

tial public offering of 1.5 million shares of common stock. Of the total, 950,000 shares will be sold by the company, and 550,000 shares will be sold by certain shareholders. Proceeds to the company will be used to repay debt, furnish working capital and provide capital for possible acquisitions.

\$\$\$

The American Stock Exchange has admitted to trading 3,820,332 common shares of **International Power Machines Corp.,** a Dallas area-based company, which manufactures and markets power systems for computers and other equipment. Trading under ticker symbol PWR, the newly listed issue opened on 100 shares at 14.



## You'll get a hard look at the software market in Computerworld's May 25th Special Report "Systems and Utility Software"

How far has the systems and utility software market come and what future trends should users be on the lookout for? *Computerworld* has some answers—based on extensive research we've conducted in this sector of the software market. In this comprehensive Special Report edited by Rita Shoor, you'll read:

- The difference between the apparent cost of software and the price you really pay through bad record keeping, lost discounts and other hidden costs.
- How the right utility software can improve your thru-put and application development in your organization.
- A review of how end-users put these "workhorses" to use and take advantage of hidden values.
- Plus, accounts of user experiences and tutorial essays along with reviews of current products and predictions about future trends.

If you're an MIS executive, DP Manager, Supervisor or Programmer, you'll find our May 25th report especially valuable. If you market systems or utility software, your ad should be there. Ad close is May 8th. For details, contact your *Computerworld* representative. Or, to reserve ad space, call Frank Collins at (617) 879-0700.



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Teletype; Telex Computer Products; Texas Instruments; Trilog; Universal Data Systems; Versatec; Xylogics.

The schedule for the 1980/81 Series is:

Sept. 8, 1980 Newton, MA  
Sept. 30, 1980 Valley Forge, PA  
Oct. 22, 1980 St. Louis, MO  
Nov. 18, 1980 Palo Alto, CA  
Jan. 13, 1981 Orange County, CA  
Feb. 3, 1981 Ft. Lauderdale, FL  
Feb. 5, 1981 Atlanta, GA  
Mar. 3, 1981 Dallas, TX  
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Apr. 2, 1981 Denver, CO



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## Orders & Installations

Westinghouse Datascore Systems has signed a contract to process the 1981 population census for Venezuela. The contract includes the purchase of two W201 scanners and maintenance and training for personnel.

Mitsubishi Heavy Industries (MHI), Tokyo, has ordered two large-scale Sperry Univac computer systems, valued at \$4.5 million, for its shipyards in Yokohama and Nagasaki.

Logicon, Inc. has received a \$1,140,000 contract to provide an electronic data transmission subsystem for the Dade County, Fla., rapid transit system. The award was made by Computer Sciences Corp., and the Logicon subsystem will consist of a Loginet facilities monitoring system that transmits data from the stations to a central control computer and also transmits controls from the central computer to the stations.

General Electric Information Services Co. has entered into an agreement with Western Electric Co. to provide programming support and computer services to the Bell System on a nationwide basis.

Digital Communications Corp. has been awarded a two-year contract for the development of the Digital Channel Efficiency Model (DCEM). The DCEM development effort is sponsored under a contract issued by the Air Force Systems Command, Rome Air Development Center, Griffiss Air Force Base, New York.

Planning Research Corp. has received contracts totaling more than \$22 million for computerized real estate listing services. A subsidiary, PRC Realty Systems of Virginia, will both provide computerized real estate listing services and publish real estate listing books for two multiple listing services and six boards of realtors across the country.

Computer Sciences Corp. has signed three agreements concerning its hospital information system, Infocare. Contracts for the installation of the system have been signed with Peninsula General Hospital Medical Center in Salisbury, Md., and Fort Sanders Presbyterian Hospital in Knoxville, Tenn. Under a separate agreement, Computer Sciences and BSL Technology agreed in principle to the joint development of a clinical laboratory computer system that hospitals will be able to use in an integrated mode with Infocare.

Carleton Corp. has signed a national contract with Tenneco, Inc. to supply the oil company with its Auditec system. The software package will be used by Tenneco during field audits at its IBM data centers around the world.

The PRD Electronics Division of Harris Corp. has received a \$35.5 million contract for computer-controlled equipment to test the electronics aboard Navy fighter jets and helicopters.

National Data Corp. announced that Atlantic Richfield Co. has elected to exercise its right to extend the Facilities

Management Agreement with National Data and National Billing Systems, Inc.

Harris Corp. has been awarded a \$2.3 million contract by Fluor Corp. for the conceptual design of a communications system to support construction of a new natural gas pipeline across Alaska.

Michigan Technological University has ordered a computer system valued at about \$1 million from Sperry Univac. The processor, a Univac 1100/80 system, will be used to provide for the data processing needs of students and faculty.

Holston Valley Community Hospital in Kingsport, Tenn., has ordered a DPS 8/20 large-scale computer system and associated equipment from Honeywell, Inc. The system will be used to support such operational requirements as financial reporting, patient maintenance and admissions.

Toyota Motor Sales of Torrance Calif., will install the MCS Automobile Dealer Management System in several hundred Toyota dealerships in the western U.S. MCS Corp., Salt Lake City, Utah, provides the MCS system, which is a comprehensive set of computer programs that allows single-entry computer management of every aspect of dealership operation.

Data Terminal Systems, Inc. has received an order valued at approximately \$7 million from Toys "R" Us, Inc. The order is for an additional 1,800 point-of-sale machines.

The City School District of Troy, N.Y. has ordered a Univac System 80 from Sperry Univac to be used for administrative and academic applications.

American Airlines of Dallas has signed a multimillion dollar contract for Dataproducts Corp.'s M-120 dot matrix printer. The airline plans to use the 180 char./sec printer in its microcomputer-based reservations and ticket printing system.

Codex Corp. has signed a contract with the Social Security Administration to supply modems and network control equipment for the agency's Ssadars system.

Security Life and Accident Co. in Denver, Colo., has ordered The Continuum Co., Inc.'s (TCC) Continuum as a replacement for its Alis-based administrative system.

The State of Texas Department of Health has ordered a Univac 1100/61 processor valued at \$2 million from Sperry Univac.

Valtec Corp. has been awarded a contract by FMC Corp., Northern Ordnance Division, under a prime contract with the Naval Surface Weapons Center (NSWC) in Dahlgren, Va. to supply 3.3 kilometers of an 8-channel graded index fiber-optic cable. NSWC will use the cable in a data bus link between the base's central computer facility and the main weapons firing range.

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# POSITION ANNOUNCEMENTS

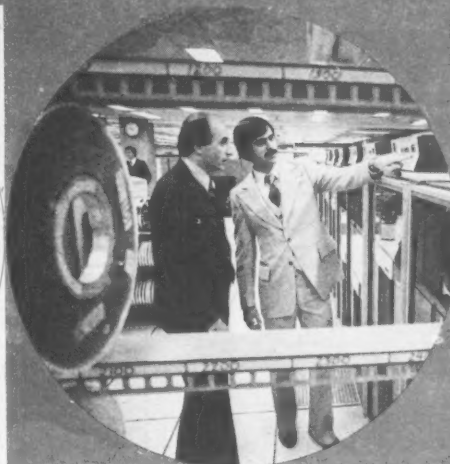
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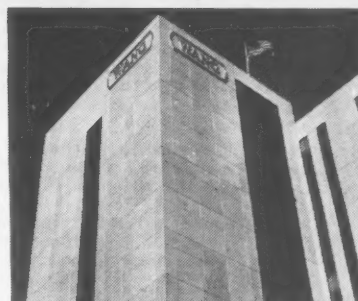
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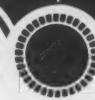
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Data Processing

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Cuyahoga Community College is a multi-campus comprehensive community college serving the Greater Cleveland Metropolitan Area. It is engaged in a massive upgrade of its computer-assisted systems in all administrative areas and is providing full computer access and academic support to its 27,000 students and 1400 faculty. Computer operations are presently staffed through a Facilities Management contract.

The direct-hire position is responsible for college leadership, planning, coordination, and control of this entire effort including major contracts for externally provided services. It is also responsible for administrative systems development generally. Position requires expertise in procedures and methods development, 3-5 years in computer systems development and operations, minimum of 1-2 years supervisory experience, Masters Degree in Business Administration or equivalent. Position to be filled as soon as possible at the administrative-level. Salary commensurate with qualifications and experience. Letters of application with complete resume of previous work and educational background and salary history to be sent to:

Director of Human Resources — Code CSR  
Cuyahoga Community College  
700 Carnegie Ave.  
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**Send resume to:**

Professor Howard A. Poole, Director  
Instructional Applications  
of Computers  
School of Education  
University of Massachusetts  
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For further information:

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- Highly developed written and oral presentation skills

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- Minimum 6 years related industry experience
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- Programming experience desirable
- Message switching experience desirable
- Highly developed written and oral presentation skills

As Product Planner, you will develop the defined specifications of Datapoint systems, maintain an awareness of competitor products, and participate in a variety of presentations to senior management and customers. The position provides genuine opportunity to shape the destiny of business plans for Datapoint's IEOS product development.

**Our San Antonio, Texas location offers the attractive features of our nation's "Sunbelt," in a growing metropolitan area.**

Should your background and interest match our requirements, please mail resume including salary history to:

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CHICAGO-5801 W. Higgins Rd. Rosemont, Ill. 60018	(312)892-9000
CINCINNATI-9 Triangle Pl. Dr. Cincinnati, Oh. 45248	(513)772-4400
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PHILADELPHIA-1150 First Ave. King of Prussia, Pa. 19406	(215)337-0170
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Candidates must have strong skills in planning, production organization and control and communication with senior management. Requires a bachelor's degree in a related subject (graduate degree preferred), and 5-7 years experience, 2 years of which are in the management of a large scale data processing office or equivalent.

The University of Rochester is a private, research-oriented university of high academic standards consisting of eight schools and colleges and a teaching hospital. It is situated in a community where the quality of life is enhanced by the beautiful countryside and strong cultural, industrial and social institutions.

Please submit a detailed description of your qualifications in confidence to: Assistant Personnel Director, University of Rochester, 260 Crittenden Boulevard, Rochester, New York 14642. Equal Opportunity Employer M/F



UNIVERSITY OF ROCHESTER

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Resumes should be sent to Marilyn Heins, M.D., Chair, Search Committee, University of Arizona Health Sciences Center, College of Medicine, Tucson, Arizona 85724. Applications will be accepted up to April 15, 1981 or until position is filled.



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### ASSISTANT DIRECTOR FOR MANAGEMENT SYSTEMS

The Data Processing Center at the University of Massachusetts is searching for an Assistant Director for Management Systems. The qualifications required of the individual to fill this position are proven administrative and supervisory skills as well as oral and written communication skills. The candidate should show proven ability to organize, plan, control and motivate staff to achieve University objectives in an MIS environment. Knowledge and experience with Administrative computer systems, including systems analysis and design, programming and documentation are necessary. Prefer knowledge of college and university management systems including information flows and office procedures. Also prefer knowledge of data base management systems including university data element definitions and relationships. A Bachelor's Degree (advanced degree preferred) and one or more years of senior management experience in a data processing installation is also a necessary qualification. Salary will be commensurate with experience.

The Data Processing Center for the University of Massachusetts system reports directly to the President. The President's Office is located in Boston and the Data Processing Center is situated in Amherst. The Data Processing Center is responsible for University-wide administrative systems.

Send resumes to: Martin A Smith, Director, Data Processing Center, University of Massachusetts, Amherst, MA 01003 by April 13, 1981. The University is an Affirmative Action/ Equal Opportunity Employer

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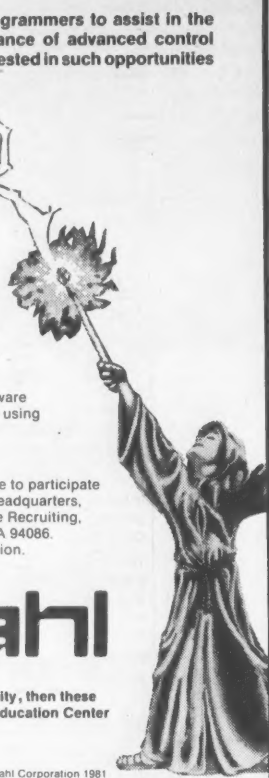
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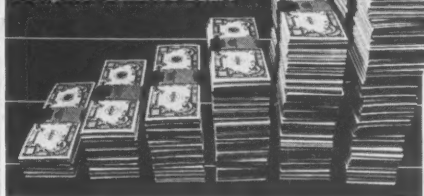
# Is Your Income Keeping Pace With the Computer Salary Boom?

**To find out, call today for our new 1981 Computer Salary Survey... It's FREE!**

Salaries of computer professionals have risen this year by as much as 20%. Is yours keeping pace? How does your current salary compare with those of other professionals at your level of responsibility and experience? Is your income growth keeping up with inflation? Are you making as much money as you should be—or could be? Is your career heading in the right direction?

Now you can easily find out, simply by calling Source

## Computer Salaries Soar!



Edu and asking for your copy of our just-released, **1981 Computer Salary Survey and Career Planning Guide**. It's yours, free! National salary averages for 1981 are shown for each of 48 categories including programming, software, systems design, data communications, mini/micro systems, data base, EDP auditing, computer marketing, management and many others—at various levels of experience.

The Survey also defines each level of responsibility, shows you how to establish career goals, develop a plan of action, evaluate your progress, take corrective action when necessary and in general, keep your career growth on the best possible course.

This is a career tool every computer professional should have, especially if you have most of your career ahead of you.

The 1981 Computer Salary Survey and Career Planning Guide has been compiled by Source Edp, North America's largest recruiting firm devoted exclusively to the computer profession. Since 1966, our annual Survey has helped thousands of computer professionals make the best decisions for their future. And now, at the threshold of sweeping changes in the industry, this new Survey can be of particular importance to you.

Call for your free copy of the 1981 edition today—in strict confidence, and with no obligation whatsoever to use our services.

**source edp**

North America's largest recruiting firm devoted exclusively to the computer professional. Client organizations assume our charges.

**Call today for your FREE report**

Simply phone the Source Edp office nearest you

**1981 Computer Salary Survey**



If unable to call, write:

Source Edp, Department CS5  
Suite 1100  
100 South Wacker Drive  
Chicago, Illinois 60606

(When writing, please be sure to indicate home address and current position title.)

### United States

<b>Arizona</b> Phoenix	602/258-9333
<b>California</b> San Francisco Palo Alto Los Angeles Van Nuys Torrance Irvine San Diego	415/434-2410 415/858-0800 213/386-5500 213/781-4800 213/540-7500 714/833-1730 714/231-1900
<b>Colorado</b> Denver Englewood	303/773-3700 303/571-4450
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<b>Georgia</b> Atlanta Central Atlanta Suburban	404/586-9350 404/325-8370
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<b>Minnesota</b> Minneapolis St. Paul	612/544-3600 612/291-2467
<b>Missouri</b> St. Louis County St. Louis Downtown Kansas City	314/862-3800 314/231-4880 816/474-3393
<b>New Hampshire</b> Nashua	603/880-4047
<b>New Jersey</b> Cherry Hill Edison Paramus Union	609/482-2600 201/494-2800 201/845-3900 201/687-8700

<b>New York</b> Midtown Wall Street Area Long Island White Plains	212/736-7445 212/962-8000 516/364-0900 914/883-9300
<b>North Carolina</b> Greensboro	919/294-6550
<b>Ohio</b> Cincinnati Cleveland Dayton	513/769-5080 216/771-2070 513/461-4660
<b>Oregon</b> Portland	503/223-6160
<b>Pennsylvania</b> Philadelphia King of Prussia Pittsburgh	215/665-1717 215/265-7250 412/261-6540
<b>Texas</b> Dallas Downtown Dallas North Fort Worth Houston Central Houston Suburban San Antonio	214/749-1900 214/387-1600 817/336-3300 713/751-0100 713/826-8705 712/344-0217
<b>Virginia</b> McLean	703/790-5610
<b>Washington</b> Seattle	206/454-6400
<b>Wisconsin</b> Milwaukee	414/277-0345
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If you are an experienced Programmer ready to move up to systems design and development, we have just what the doctor ordered for your career growth. Our project teams have initiated a strong systems development plan that will plunge you into a heavy user interface/systems design environment.

We offer the advantages of a small, close-knit shop where management has designed a clear career track that will move you to Project Leader as soon as you're ready. Our IBM 370/148 DOS/VSE environment uses CICS and will be installing minicomputer hardware in the near future.

To qualify, you'll need at least 2 years of COBOL programming experience with exposure to accounting/finance, statistical, or health care related applications; and a proven potential in systems analysis. Experience in a project management environment is a plus.

Our salaries are competitive and we offer an outstanding benefits package that includes a 4 week vacation. To investigate these career opportunities, write or call: Charles Dunaway.



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## ASSOCIATE PROFESSOR COMPUTER SCIENCE

Growing Community College, located in a beautiful rural suburb of Atlantic City, N.J. is seeking an individual who can develop and plan a Computer Science Program, relevant to the needs of private business and public agencies.

Bachelor's Degree required, MBA or Master's in Teaching preferred. Experience in both teaching and the business applications of computers is desired. An in-depth knowledge of COBOL and RPG required.

Salary to \$26,000 to Start. Send resume by Monday, April 6th, 1981 to: Director of Personnel, ATLANTIC COMMUNITY COLLEGE, Mays Landing, N.J. 08330. An Equal Opportunity/Affirmative Action Employer.

## COASTAL MAINE

Due to our rapid technical growth, Hannaford Bros. Co., northern New England's largest retail grocer is looking for a Technical Support Specialist to join our home office team in Scarborough, Maine.

The position requires a professional with DOS operating system hands-on experience and a strong working or conceptual knowledge of Database Management System. If you are a Systems Programmer and are familiar with the database support requirements of a VSAM or DBMS development environment we offer you the opportunity to join our Technical Support team. If you are an Analyst/Programmer in a database development environment with proven operating system generation skills and would like to move up to a technical Support position, then we welcome your inquiries as well.

Along with the excellent starting salary and a complete fully-paid benefit package available at Hannaford, the greater Portland area offers the following benefits: low taxes, low cost of living, low insurance costs, low pollution, low crime rate, no rush hour traffic, excellent school systems, four season recreational opportunity, rural sea coast setting, and all the amenities you would expect in large metropolitan area but without the congestion.

If you have the above qualifications and seek to maintain a high level of professionalism while improving the quality of your life style then please send your resume and salary requirements to:

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Portland, ME 04104  
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## Your Ultimate Choice

### MOST CHALLENGING START-UP IN DATA PROCESSING HISTORY YOU CAN BE A PART OF IT

M. David Lowe has been retained to staff the largest start-up operation in data processing history—a major computer center in an overseas location to support a geophysical research and development effort. Top managers have been brought in from around the world, and they are ready to begin selecting a staff that will change the meaning of "state-of-the-art" software. Consider the opportunities:

#### MONEY . . . .

... Net income after all expenses will be greater than your current U.S. gross income; i.e., if your current base salary is \$30,000, you can plan on banking \$35,000.

... Includes a 16% cash bonus upon acceptance and a 40% expatriate bonus.

#### TECHNICAL OPPORTUNITIES . . . .

... 1981 hardware will be twin IBM 3033s, with the five year plan calling for multiple 308's (unless IBM develops something more powerful).

... Latest generation IBM operating system.

... Worldwide telecommunication network.

... Largest variety of geophysical and petroleum engineering development projects in oil industry history.

#### TRAVEL . . . .

... Forty days vacation the first year, plus a tax protected trip to your point of origin. The time and money can be used to see Europe, Africa, the Far East.

... If you are married, but elect to go single status, the company will give you three tax sheltered trips home each year.

#### LIVING CONDITIONS . . . .

... Family or single status American-style living.

... First rate hospital accredited by the North American Hospital Association.

... American-style grocery store.

... Schools that produce an average score in the 90th percentile on U.S. achievement tests.

With inflation and recession outpacing your salary increase 2:1, why not consider interviewing on a position that can make you financially secure for life in just a few years. We currently have openings in the following areas for unit supervisors, project managers, project leaders, senior analysts, and technicians.

**GEOPHYSICAL APPLICATIONS.** Positions for programmers through project managers in the areas of seismic edit, statics solution, CDP, velocity analysis, deconvolution, migration, stack, pre-sis, and de-multiplex/correlation. All systems will be done in FORTRAN or PL/I on IBM hardware.

**PETROLEUM ENGINEERING APPLICATIONS.** Positions for programmers through unit supervisors in the areas of reservoir simulation, fluid flow, well database, and production allocation. All systems will be done in FORTRAN or PL/I on IBM hardware.

**SYSTEMS PROGRAMMING.** Opportunity to participate in the installation and development of the most technologically advanced system ever put together. Openings for MVS, VTAM, TSO, and IMS systems programmers.

**DATA BASE ANALYSTS.** IMS development for maintenance of a huge amount of geophysical data. Will be using IMS 2.0 as soon as it is released.

**EDP PLANNERS.** Responsible for installation and facilities planning, contracts control, staff education, and service-level monitoring.

All inquiries will be treated with the confidentiality and professionalism that you deserve. For further information contact Cliff Reilly at (713) 445-6464 or Ron Timm or Roger Hall at (713) 658-9898.

### ALL FEES ASSUMED BY CLIENT COMPANIES NEVER A CONTRACT TO SIGN

Please submit salary history with your current resume

*M. David Lowe*  
PERSONNEL SERVICES

478 Houston Natural Gas Bldg.  
1200 Travis  
Houston, Texas 77002

(713) 445-6464  
(713) 658-9898

## PROGRAMMER ANALYSTS

Mellonics Information Center, providing data processing services nationwide, has excellent career opportunities for the experienced, as well as the junior Programmer. Our Programmers interact with customers and department heads to develop applications from design through implementation, and see the fruits of their work come to life. Our current projects include: Data Base Legal Information Systems, Payroll/Personnel Systems, Automated Computer Scheduling, Computerized Billing, Manufacturing and Financial Applications.

If this interests you, call COLLECT and arrange an interview at your convenience or send us your resume.

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Jona Hester  
(213) 887-5039



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### ADJUNCT DIRECTOR, PRODUCTION SERVICES SAN JOSE STATE UNIVERSITY

Under the direction of the Deputy Director of Information Systems and Computing, either directly or indirectly supervises staff engaged in the operation, maintenance and evaluation of all computing, unit record and data entry equipment and other media conversion devices. Responsible for the recruitment, selection, assignment, training and evaluation of personnel assigned to Production Services. Within existing policy, establishes and maintains a long and short-range operations schedule in cooperation with user offices. Reviews proposed new applications and programs and projects their impact on the existing operation. Recommends changes in staffing, equipment, operating systems, policy and procedure to maintain and improve the effectiveness of the Production Services area. Develops, maintains and enforces security, back-up, and disaster recovery procedures. Serves as an authoritative resource to the Deputy Director and the campus community on technical matters related to the physical configuration and capability of computing and data processing equipment. Acts as Deputy Director in the latter's absence. Requires BA/BS or equivalent, preferably in business administration, management, computer sciences, mathematics, physical sciences, or other computer-related field. Advanced degree highly desirable. A minimum of five years experience with increasing responsibility in a data processing systems analysis, design and programming with at least three years full-time supervisory experience in a data processing operation utilizing medium-to-large scale computing facilities. Must be creative and innovative in the development of computer applications. Must have demonstrated ability in effective written and verbal communication with individuals and groups representing various academic, administrative and business areas. Preference will be given to persons with demonstrated competence in long-range planning, zero-base budgeting, facility planning, site preparation, security, computer systems performance evaluation, and/or utilization accounting and billing. **SALARY: \$30,028-36,504 per year. APPLICATIONS MUST BE RECEIVED AT SAN JOSE STATE BY 4/1/81. Send resumes to Personnel Office, San Jose State University, Washington Square, San Jose, CA 95192. SJSU is an EOE/Affirmative Action/Title IX Employer.**

### DATA PROCESSING MANAGER

Miami Paper Company, a highly successful subsidiary of Pentair, Inc. has a management opportunity for a data processing professional in West Carrollton, Ohio (just outside of Dayton). With our hands-on approach to management, you will be supervising and working closely with 2 computer operators on an IBM 34 system.

A degree is preferred, along with 2-5 years of experience, including some experience in supervising computer operators.

You can go far at Pentair, a growing company with an excellent future. Salary range is in the mid to high \$20's, with a highly competitive benefits package and generous relocation allowance. Qualified candidates may call Ron Lindberg TOLL FREE at 1-800-328-9267 to discuss this unique opportunity.

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### COMPUTER GRAPHICS CAREER

Applied Dynamics International, Graphic System Division has an exceptional career opportunity for a strong professional to assume responsibility in Field Sales. This is a key position in a company specializing in Raster Graphics Display Systems.

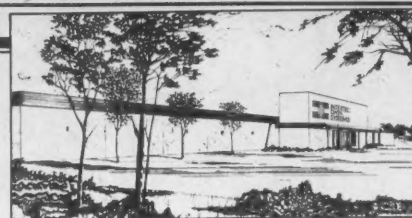
#### REGIONAL SALES MANAGER WESTERN STATES

Selected candidates will manage and direct the activities of manufacturers' representatives in meeting sales goals. The individual chosen for the position must possess a strong background in computer graphics and a minimum of 5 years OEM and End-User selling experience including 2 years supervising reps. A degree in engineering is preferred. Please send resume with salary and work history in confidence to:

Lillian Russell  
ADI-Applied Dynamics International  
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Large process co  
seeks indi with 1+ yrs  
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INTERTEC'S Corporate Headquarters, in Columbia, South Carolina, is the home of the company's engineering, manufacturing, marketing and service operations for its full line of microcomputer equipment.

#### UNIQUE CAREER OPPORTUNITIES

A young and growth-oriented company, INTERTEC has earned an international reputation as a leader in the rapidly expanding field of microcomputer and computer peripheral equipment. The unprecedented growth of Intertec Data Systems since its inception in 1973 has yielded many new and exciting careers.

#### DESIGN ENGINEERS

Several highly visible opportunities for top notch engineers in our design and development department are available. Openings exist for engineering development leaders with the following qualifications:

... Electronic engineer having design and development experience in Winchester Disk Drive technology. Prior experience will have included design of rigid disk read/write head electronics and all servo control functions associated with this technology. Requires a technical degree with a minimum of three years experience in rigid disk media design and development. The successful candidate will be responsible for all the electronic aspects of rigid disk development from concept to product stage.

... Mechanical engineer having experience in the design and development of rigid disk media specifications, Winchester read/write precision head dynamics and rotational media characteristics. Requires a technical degree with a minimum of five years in rigid disk media design and development. The successful candidate will be responsible for all mechanical aspects of rigid disk development from concept to product stage.

Please call or send detailed resume, in confidence, to:

**INTERTEC  
DATA  
SYSTEMS.**

Thomas M. Osmer  
**INTERTEC DATA SYSTEMS**  
2300 Broad River Road  
Columbia, SC 29210  
803/798-9100  
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## TECHNICAL SERVICES MANAGER

**Capitalize On  
Your Career**

As a major insurance holding company, we have an opening in our Information Systems & Services Department to support major development projects. Our current environment includes the 3033 MVS operating system.

We have an immediate opportunity for a Technical Services Manager to direct the activities of our Technical Services Unit. This individual will be responsible for the performance, utilization and support of the operating systems and associated software. You should have 10 years of overall D.P. experience, which includes 5 years OS and 3 years MVS experience, in a technical environment.

In addition to career challenge and advancement, we offer excellent compensation and liberal benefit programs, including a generous relocation package to Louisville. For immediate consideration, send your resume with salary history and requirements to:

Kathy Coin, Dept. CW323  
**CAPITAL HOLDING  
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Louisville, KY 40232

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**DATA PROCESSING CONSULTANTS**

The Sacramento office of Arthur Young & Company is seeking experienced EDP Information Systems professionals who are interested in dealing with a diverse array of projects, industries and problems. We emphasize quality of experience rather than length of experience. We seek individuals who meet the following criteria.

**DATA BASE CONSULTANT**

Experience in data base definition, analysis, design and counseling. Business orientation and strong technical report writing and client handling skills required.

**INFORMATION SYSTEMS CONSULTANT**

Experience in systems analysis and design, computer feasibility and hardware/software selection projects. Background in financial systems and/or knowledge of governmental operations helpful. Please send a detailed resume in confidence to:

Theodore P. Wroblecky  
**ARTHUR YOUNG & COMPANY**  
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**SYSTEMS & PROGRAMMING MGR \$30,000+**

Our client, a multi-billion dollar, well known and leading Carolina based Bank/Holding company, seeks a systems & programming mgr for their rapidly expanding project leaders and their staff of strategic and key assignments in a 3032 OS/MVS IMS State-of-the-Art environment. Client req'd a degreed professional with min 5 yrs DP background exhibiting solid progression from programming through design and analysis to supervision. Successful candidate will have demonstrated ability in developing and maintaining positive user relationships and managerial skills. Banking or financial industry exp is preferred. Client offers continued growth potential and full career benefits. All costs paid by client to incl interview and relocation expenses. For more details, contact Larry Stone, 704/378-0000, or rush credentials (no resume needed) in confidence to FOX-MORRIS PERSONNEL CONSULTANTS, 1742 Southern National Center, Charlotte, NC 28202.

**PROGRAMMER/ANALYST**

Planning and coordination of data processing in the geology department including hardware acquisition, software acquisition, programming and maintenance, database management and cost control.

Assimilation, compilation, and editing of geological exploration data for purposes of economic analysis of mineral and petroleum prospects; conversion of that data into programmable form for electronic data processing. Operate computer terminal and plotter. Requirements are B.Sc. with geology major and knowledge of exploration geology and computer programming and application work. \$21,600 per year for 40 hours per week Monday-Friday 8:30 a.m. - 4:45 p.m. Contact:

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# Hardware & Software Engineers: What's your first step to a better career in the Sunbelt?

## Hint.

Your interview with us in Long Island March 31-April 5.

E-Systems in Dallas, Texas, is a growing company where some of the world's toughest high technology electronics problems are solved daily. We'll show you how your career growth at E-Systems can parallel our unprecedented corporate growth. We'll show you excellent work environments and management attitudes. And we'll show you some of the best salary standards and fringe benefits offered by any electronics company anywhere.

And, for your convenience, we're making special relocation arrangements for persons we move to the Dallas area.

**We offer SOFTWARE ENGINEERS:**

- wide range of jobs:
  - a real-time distributed/embedded software systems involving command and control, switching, communications, signal processing/analysis, DBMS, graphics, and man-machine interfaces.
  - Also: research, systems engineering, requirements definition, design, implementation, testing
- state-of-the-art technology:
  - mainframes: IBM 370/155/158, IBM 3033, CDC Cyber 175
  - minis: VAX 11/780, PE 3220, SEL 32/7780, DG S/330, PDP 11/34, PDP 11/23, HP 21 MX, TANDEM
  - micros: Motorola 68000, 6809
  - special-purpose hardware: bit-slice processors using AMD and 2900 Logic, parallel processors using Fairchild F 100K ECL, communications networks using NSC Hyper-channel hardware, Multi-Megabyte Multiport Memories, and much more!
- broad range of languages:
  - high order languages like Pascal and Structured FORTRAN
  - assembly languages and Microcode
  - PDL and Programmer's Workbench

**We offer HARDWARE ENGINEERS:**

- wide range of jobs:
  - systems analysis, design, development, test, and integration in the following areas: computer-based intelligence and reconnaissance systems, command and control systems, electronic warfare, communications systems, digital image processing
- state-of-the-art technology:
  - high speed digital logic and signal processing
  - communications theory, digital and analog design, and filter design
  - antenna/arrays for precision direction-finding systems
  - RF&IF processors & microwave integrated circuitry
  - microprocessor bit-slice, and high speed, parallel pipeline processors utilizing MOS, TTL, & ECL
  - high probability of intercept receivers

Our official representatives will be in Long Island March 31st thru April 5th at the Sheraton Inn La Guardia. So take the hint today and call COLLECT to pre-arrange your appointment (214) 272-0515, ext. 3119; or send your resume to Professional Placement, E-Systems, Inc., Garland Division, P. O. Box 226118, Dept., HS41, Dallas, Texas 75266.



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Garland Division

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**Coordinator of Academic Computing Services****Duties & Responsibilities**

Reporting to the Director of the Center for Computer and Information Services the position is primarily responsible for the coordination of academic computing among students, faculty and researchers. The person in this position will be responsible for consultation and assisting faculty and researchers with problems requiring computing resources. The planning, upgrading, maintaining and coordinating the academic libraries and services among the time-sharing terminals and batch facilities are also duties of this position.

**Qualifications**

Education: possession of a Bachelor's Degree in Computer Science or a closely related area from an accredited college or university; knowledge of statistics would be helpful but not essential.

**Experience**

Preferably two or more years of college or university experience and/or demonstrate the capacity to coordinate academic computing services.

University Data Processing Equipment The University owns and operates a Burroughs B6600 computer system to support batch and time-sharing services.

Please send resume and salary requirements to Mr. George J. Germann, Director, Center for Computer and Information Services, Seaton Hall University, So. Orange, N.J. 07079.

Equal Opportunity/  
Affirmative Action Employer

## HOUSTON

**Data Base Analysts (DL-1/CICS) . . . . . to \$36K**

Major manufacturer (#1 in their industry) in an excellent location is seeking (2) data base analysts to support applications development in the design and creation of required data bases. Working directly with users as well as a development team will require good communication skills and an aggressive and innovative individual. Data administration is a close-knit team of professionals who take great pride in their work and requires individuals with that same sense of pride. Excellent benefits and compensation.

**Systems Analyst (Mfg.) . . . . . to \$33K + BONUS**

One to two years of experience in the development and maintenance of manufacturing systems (bill of materials, shop floor control/scheduling, and MRP) in an environment which includes COBOL or PL-1 and IMS qualifies you as a candidate to join an aggressive organization who will compensate data processing professionals for their contribution to the profit objective.

**the  
javis walker  
group**

3050 S. Post Oak Road  
Houston, Texas 77056  
(713) 961-3600



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Programmers • Applications Development • System Analysts • Compiler Designers  
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## The most livable city in America has a few openings.

The city is Portland, Oregon. Big enough to be stimulating, small enough to be comfortable. And too beautiful to be believed.

The openings are for Programmer Analysts at Crown Zellerbach, in our systems development group. We stand tall in the forest products industry; in fact, we're the second largest paper company in the U.S.

Join our expanding staff. We're looking for someone who's been programming in an IBM OS/COBOL environment (2-4 years) and has system design experience preferably in a manufacturing environment. Someone who has a BS degree in Business, Computer Science, or a related field. And someone with excellent communication skills.

If that sounds like you, and you want to enjoy your work and the city you live in, call (503) 221-7277. Or send your resume to Pete Shipp at Crown Zellerbach, 1500 S.W. First Avenue, Portland, OR 97201. An Equal Opportunity Employer F/M. No agency referrals, please.



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## CUSTOMER SERVICE SUPPORT ENGINEERS & INSTRUCTORS

If you're looking for Challenge with a capital "C," we want to tell you about the kind of opportunities available at Datapoint in San Antonio, Texas.

### Datapoint Turns Challenge Into Opportunity!

#### SUPPORT ENGINEERS

You will be responsible for product development, maintenance strategy and product support for various products. These positions require 5 to 7 years hardware and/or software systems experience on CPUs, disks, tapes and printers.

#### INSTRUCTORS

You should have 2 to 4 years experience as instructor or course developer. Applicable experience must include processors and disk based systems training. Disk and printer experience is helpful and telecommunications background is a definite plus.

### Join us in SAN ANTONIO... The "Fiesta City!"

These positions offer competitive incomes, generous benefits and a work environment that provides both personal and professional growth.

Please send resumes including salary history to Marianne Palacios, Datapoint Corporation, 9725 Datapoint Dr., MS T-81, San Antonio, Texas 78284.

We are an equal opportunity employer M/F/H.



#### LEAD ANALYST UNIVERSITY OF WISCONSIN-PARKSIDE

This individual will be the Associate Director and direct the activities of four programmer/analysts in developing, enhancing and maintaining our university information system. The successful candidate will assume leadership for system design and implementation of on-line administrative systems.

Desired qualifications include a Bachelor's degree with demonstrated skills in project management. Experience in teleprocessing in an educational environment is preferable.

UW-Parkside is a medium-sized university in a pleasant suburban environment located in southeastern Wisconsin. Equipment includes a DEC 11/70 and IBM 370/135 under DOS/VSE using WESTI teleprocessing software. An IBM 4331-2 is scheduled in January.

Starting salary depending upon experience and education. Outstanding fringe benefits and advanced educational opportunities available. Send resume to:

William M. Misamore  
Director, Computer Center  
University of  
Wisconsin-Parkside  
Box No. 2880  
Kenosha, WI 53141  
An Equal Opportunity Employer

#### FLORIDA DATA PROCESSING

New Installation  
Staffing Now  
Programmer Analysts  
Systems Analysts  
Systems Programmers

Send resume including salary to

AVAILABILITY, INC.  
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Tampa, Florida 33622

#### COMPUTER DATA PROCESSING

Department Chairman position open July 1 for data processing chairman at private college. Responsible for development and teaching of data processing curricula and computer support services for the college. Master's degree required. Must have broad experience in business data processing. Salary negotiable. Send resume to: Victor Morris, Ph.D., National College, P.O. Box 1780, Rapid City, SD 57709. Phone 1-800-843-8892.

## CULLINANE Software Technical Writers

Cullinane Database Systems, Inc., a recognized leader in the field of data management system software, is looking for writers to produce user's guides, reference manuals, quick-reference cards, and other technical literature oriented to its end users. Familiarity with operating systems and a programming language such as COBOL or PL/I is required; exposure to database management or telecommunications is helpful. These positions provide excellent opportunities for highly motivated individuals with demonstrated writing ability who are seeking challenge and responsibility in software technical writing.

At Cullinane, technical writers are encouraged to use their initiative and their writing and interpersonal skills in producing documentation that is well written and accurate. Writers work closely with the software development staff and oversee a document from design through printing, using the support of editing and production groups. Each writer has direct access to the system he or she is documenting, as well as full use of online text entry and editing facilities.

Cullinane offers an excellent compensation plan, including full medical and dental insurance, 100% tuition reimbursement, and revenue sharing.

Qualified applicants should send resume to:

Margaret E. Collins  
Personnel Manager  
Cullinane Database Systems, Inc.  
400 Blue Hill Drive  
Westwood, MA 02090

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## SYSTEMS PROGRAMMER

If you have...

- Three or more years of systems programming experience on IBM medium to large scale hardware
- O/S and CICS background
- In-depth knowledge of systems internals
- VM knowledge

We have...

- An IBM 3031 processor
- An up-to-date installation
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- A beautiful southern New Hampshire location
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This position offers...

- An opportunity for independent decision making
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## SYSTEMS PROGRAMMING DDP SPECIALIST

Suburban Philadelphia Division headquarters of Fortune 500 company offers position on small, respected staff for a specialist who can establish a Distributed Data Processing system for a multi-computer (IBM 303X VAX) nationwide network by installing several VAX 11/750 processors.

Your experience should include two years of systems programming (preferably on VAX operating system using VMS utilities). In addition, you should be skilled in assembly language (preferably VMS MACRO) and have experience with IBM HASP commands and at least two years of COBOL programming in an IBM OS/VS JCL environment. Familiarity with internal workings of network architectures such as DECnet and SNA would be helpful, as would exposure to computer aided graphics. You should have a B.S. degree in Computer Science or its equivalent.

Since our staff functions as an in-house consulting team, you must be willing and able to travel (about 33%) and you must possess good communication, training, and other consulting skills to deal effectively with users, suppliers, and field operating personnel.

Compensation package will be commensurate with ability and experience, and will include participation in bonus plan. Relocation expenses paid by company. Apply by sending your resume to:

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# COMPUTER PROFESSIONALS

We developed our interactive, real-time worldwide system ourselves. And that's just one good reason to join Emery!



Emery Air Freight is the world's largest air-freight forwarder for many good reasons. One of the biggest is our computer system. In fact, our system is so sophisticated, it gives us capabilities that far exceed much of our competition.

Because of our dynamic business growth, we are experiencing dynamic systems growth.

Emery needs people. Good ones. Now.

These are outstanding growth opportunities at our international DP center in Wilton, Connecticut for individuals capable of taking the lead and innovating. Individuals who aren't afraid of a challenge. Individuals like you.

**APPLICATIONS PROGRAMMER/ANALYSTS**  
Financial-Enhance and develop customer and management information systems, including business graphics. Requires minimum 3 years programming experience in COBOL.

**Rating and Billing**-Online rating; batch process billing of over \$2 million in shipments daily. Requires minimum 3 years programming experience (at least 1 year BAL, some COBOL).

**Tracking and Tracing**-Enhance and upgrade worldwide real-time system. Experience with direct access files desirable. Requires minimum 3 years programming experience (2 years BAL).

**SOFTWARE PROGRAMMERS**  
General software and systems support. Requires minimum 3 years programming experience (2 years BAL).

**DATA PROCESSING SUPERVISORS**  
Systems and Applications-Control one or more concurrent projects. Requires minimum 5 years programming experience (2 years as a supervisor in COBOL and/or BAL environment).

Emery's concern with achievement and excellence is evidenced by our policy of competitive salaries and liberal benefits including relocation assistance.

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Evaluate major user needs through feasibility studies and research of existing systems. Define project, then review progress periodically. Requires experience with large-scale IBM environment; minimum 5 years data processing experience (3 years in systems analysis).

It is important to affiliate with a company that holds data processing in high regard. A company that supports hardware expenditure. A company that knows how much data processing success ensures corporate success. A company whose data processing growth and development is truly explosive.

### Our Hardware

- ☐ Twin IBM 370/158-3 equivalent
- ☐ IBM Color Graphics
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- ☐ IBM System 7
- ☐ Individual programmer terminals VM/CMS)

### Our Software

- ☐ CCAP-on-line operating system, enhanced and maintained internally
- ☐ DOS/VS
- ☐ VM/CMS
- ☐ OS (MVS/SNA)-Lab environment

Call us to speak with one of our Computer Professionals.

In Washington Call: (202) 289-8281

In Boston Call: (617) 536-8988

In Connecticut (and all other states) Call: (203) 834-3201.  
Or send your resume or a letter with salary requirements to: Emery Air Freight, Employment Department CW-23, Wilton, CT 06897. We'll respond quickly.

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Air Freight  
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## SENIOR COMMUNICATIONS ANALYST

Data Card Corp. is the world's leading manufacturer of high technology machines that emboss and encode information onto cash, credit and ID cards. Now, we're moving ahead into the communications field. On-line systems represent a new and fast growing application for Data Card and this has created the need for a Senior Communications Analyst who will be the focal point in design activities to ensure the creation and support of competitive communications products. We need someone who can meet the challenge of bringing the state-of-the-art to our communications environment and keep us at the leading edge of technology.

Responsibilities will include translating product feature specifications into operating software and assisting in development of hardware to meet system requirements. Qualified candidates will have significant experience in communications with background in IBM BTAM and VTAM access methods, 327X terminal protocol and local device control e.g. 328X, ASCII async protocols. Exposure to IBM 3776, 3780 and 3767 desirable.

To the right person, we will offer an excellent salary and complete benefit package, in addition to a unique opportunity for high visibility within an expanding area of the company. To find out more, call Robin Berry COLLECT at (612) 933-5522 or send your resume with salary requirements to DATA CARD CORP., Dept. #004, 11111 Bren Road W., Minnetonka, MN 55343. An equal opportunity employer.



Equal Opportunity  
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## MANAGER OF MVS SYSTEMS DALLAS, TX

Our client, a highly respected, multi-million dollar Dallas-based firm, seeks an experienced MVS SYSTEMS INTERNALS Professional for a leadership role in an expanding DP facility.

The successful candidate will possess managerial experience or strong potential; a minimum of TWO YEARS OF INTENSIVE MVS experience; FOUR YEARS TOTAL SYSTEM PROGRAMMING experience; solid IBM or compatible hardware exposure, telecommunications, IMS, and experience with other program products is a big plus.

The client offers an excellent technical opportunity; dynamic career path; competitive salary and excellent benefits; RELOCATION PACKAGE.

We are consultants to DP Management. Respond in confidence to:

Michael Simpson & Associates  
Executive Search  
4020 McEwen, Suite 181  
Dallas, TX 75234  
(214) 980-0011

## MATHEMATICIAN/MODELER

Unique opportunity for individual with background in mathematics plus good FORTRAN and other languages. Will prepare profitability analysis for San Francisco-based financial services company and work on computer modeling and systems design. Salary range will depend on experience.

If you are interested in being in a high visibility position in an aggressive young company, please forward your resume, in confidence, to Vicki Emerson, Personnel Manager.



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## SYSTEMS PROGRAMMER

Multi-faceted opportunity for knowledgeable EDP pro. 2+ yrs ASSEMBLER programming with good knowledge of VSAM and CICS internals. Rapidly growing environment consists of 370/148 and 145 DOS/VS with PANVALET. Outstanding benefits include 4 weeks vacation and generous bonus.

\$37,000

FEE PAID

Call: MARTY AMATO



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### PROJECT MANAGER

Responsibilities: Plans, organizes, controls, and reports on project activities in the assigned area of the department. Directs supervision of up to 8 programmer/analysts.

Experience: We require at least 5 years experience with a retail background. Experience in commercial data processing including applications programming, systems analysis, management science methods. A BA or BS in mathematics, computer science, business administration or engineering is preferable.

### SENIOR PROGRAMMER ANALYST

Participate in the design and implementation of one of the most comprehensive Retail Data Collection Systems in the country. This will consist of helping to implement a polling network to collect sales information from as many as 2,000 stores as well as helping to design and implement one of the premiere on-line sales audit systems in the country. Direct responsibilities will consist of design and coordination of project activities as well as providing work direction to team members.

Experience: At least 4 years in data processing including applications programming, 3 years; systems analysis, 1 year; management science methods, 1 year. Any of the following experiences will be considered highly desirable: Datacom DB and DC; experience with polling in a POS environment; and sales audit applications.

Current environment includes the IBM 370/155 and 4341 with an NCR polling system.

If you feel that you qualify, please send your resume including salary requirements, in confidence, to Bill Rogers, Recruitment Director.

## VOLUME SHOE CORPORATION

3231 E. 6th St., P.O. Box 1189

Topeka, Ka. 66601

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## FLORIDA

### Enjoy the FUN AND LEISURE of the sunshine state

With one of south Florida's largest and most professional Data Processing Service Bureaus. Our business is booming and we need several highly skilled Data Processing professionals to join in our growth and prosperity.

#### PROGRAMMING MANAGER

Minimum of seven years NCR Neat 3, Level I and II financial application programming required, on-line terminal communication, project leader and/or management experience, plus bachelor degree is preferred.

#### SYSTEMS MANAGER

Highly experienced Systems Analyst in maintenance and development of bank/savings and loan applications required. Bachelor degree plus management experience highly preferred.

#### APPLICATIONS PROGRAMMER

Minimum of two years NCR Neat 3, Level I and II programming experience, bank/savings and loan applications background highly preferred.

#### CUSTOMER SERVICE COORDINATOR

Considerable working knowledge of savings and loan/bank operations related to data processing, good oral and written communication skills and problem solving ability.

In addition to top salaries in the industry, we offer excellent opportunities for professional growth, relocation expenses, annual bonus, dental, medical and life insurance fully paid for employee and dependents, five (5) year vested retirement plan and much more!

Please send resume in confidence to:

Don Childs

Assistant Vice President, Personnel

8991 Southwest 107 Avenue

Miami, Florida 33176

Or call collect:

(305) 279-7721

EQUAL OPPORTUNITY EMPLOYER

## MVS-SYSTEMS PROGRAMMER

AMPEX is a world leader in the design and manufacture of professional audio and video tape recording equipment. At AMPEX we house the latest state-of-the-art equipment in a stimulating atmosphere of creativity and professionalism. We start with top data processing professionals and work with them to further upgrade and advance their skills in the exciting world of data processing. At AMPEX, our emphasis is on personal career development.

Our technical environment consists of: large MVS 370 as the hub of an SNA network of DOS/VSE 4300s: MVS, JES 2, TSO, IMS, CICS, ACF/VTAM, ACF/NCP and data dictionary.

As a SENIOR MVS SYSTEMS PROGRAMMER you will have an opportunity to participate in the installation, maintenance, tuning and performance management of state-of-the-art systems software: MVS, ACF/VTAM, ACF/NCP, TSO, CICS and JES 2. Experience or knowledge of capacity planning or performance management is a plus.

Located in the easily accessible South San Francisco Bay area, AMPEX offers a highly desirable benefits package, on-site employee recreational facilities and much more. You are encouraged to send your resume today to Danny Norman or call him collect at (415) 367-2103.

# AMPEX

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#### SAN FRANCISCO AREA

#### SYSTEMS PROGRAMMER - MVS

#### DATABASE ANALYST - IMS

#### SR. LEVEL PROGRAMMER/ANALYSTS

Major California corporation is seeking a number of experienced data processing professionals to work in a state-of-the-art MIS department utilizing IBM 3031-3033 hardware. Current openings include a systems programmer with a minimum of one year experience in MVS software, a Database Analyst with knowledge of IMS Database, and two senior level Programmer/Analysts.

A generous relocation program, top salaries, plus liberal employee benefits for the right candidates. Forget the resume, just send a note with your present position, experience and current salary to:

Richard Theobald

Richard Theobald & Associates

100 S. Ellsworth, 9th floor

San Mateo, CA 94401

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## 317 DP POSITIONS OPEN IN FLORIDA

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- DP managers • Operations
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#### DRAFT AD

#### Scientific Programmer

We are seeking a well motivated individual with a B.S. in Math or computer science to develop data base management system, linear programming and mathematical modeling programs by the utilization of computer model & operations research techniques. Must have knowledge of IBM 370, PDP 11/20, UNIVAC 1100, DEC 20/60;

Salary \$20,000 per year

Send Resumes to:

Systems Architects, Inc.  
Thomas Patton Drive  
Randolph, MA 02368  
#1339

#### EDP

#### MANAGER

4 years experience or 4 years related experience in management of bank computer systems dept. 4 yrs. high school; must have thorough knowledge of NCR EDP; proficiency in NEAT 3 & COBOL. Experience required with processor and administration of banking application software for all on-line functions. Manage all areas of on-line banking data facility. Liaison between data facility & bank dept. heads. Supervise 20 people comprised of technical programmers & operations staff. Monitor hardware & software & make recommendations for upgrading. Work with dept. heads on data base conversions resulting from future mergers. \$750 per week to work 40 hours/5 days/week.

PLEASE SEND RESUME TO: Albany Savings Bank, Corner of South & North Pearl Streets, Albany, N.Y. 12201.

# Computer Sciences Corporation

## Senior Systems Programmers

### El Segundo, California

Computer Sciences Corporation — one of the world's largest independent software firms and a leader in the information sciences — has exceptional opportunities at its California headquarters.

Our active Systems Support organization seeks two senior systems programmers to support INFONET's worldwide time sharing network. Responsibilities include system dump analysis, technical evaluation of software design proposals, operational utility development and maintenance, operating system maintenance, and hardware and software problem solving.

The ideal candidates for this demanding assignment should have previous experience in system programming, assembly language programming and knowledge of operating system internals. Univac 1100 series experience is preferred.

If you have the qualifications we need to fill these assignments, we can offer an environment of growth and professionalism, complemented by an attractive salary and a comprehensive benefits plan. For immediate consideration, forward your resume with current salary requirements to Mr. A. Cristina.

The only limitations are the ones you bring with you.

# CSC

INFORMATION NETWORK GROUP

650 N. Sepulveda Blvd.

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Dan is a Professional Counselor with E.P. Reardon Associates, one of New England's most prestigious professional placement firms. He specializes in placing Engineering and Scientific Software Professionals in the following areas:

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To find out how Dan can help you, call him today at (617) 329-2660 or send him your resume at the address below.

Clients are EOE.



**E.P. Reardon Associates**

688 Washington Street, P.O. Box 228, Dedham, Mass. 02026

## DEPARTMENT CHAIRPERSON Management Information Systems

New Hampshire College has a full-time position as Chairperson and faculty member in Information Systems. Doctorate in Information Systems required. Candidates should be familiar with business applications. Salary: \$25 K+ depending on qualifications. Excellent fringe benefits package. Send letter of application and resume to:

Dr. James L. Grace  
Academic Dean  
New Hampshire College  
2500 North River Road  
Manchester, NH 03104

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# SINGAPORE AIRLINES

require  
**COMPUTER PROFESSIONALS**  
to be based in Singapore

SIA currently operates one ITTEL AS/5 and two IBM 3031 computers. Several on-line and data base systems are being planned for implementation in the next few years. IBM software used includes ACP/IPARS, IMS-DB/DC, MVS, VM, CMS and APL.

To meet our requirements, we are looking for the following computer professionals:

Computer Project Managers

Data Base Administrators  
Systems Analysts  
Systems Programmers  
Computer Training Officers

## REQUIREMENTS

University/College degree with some years' data processing experience at a senior level.  
University/College degree and some relevant data processing experience.  
For the position of Computer Training Officers, candidates with training experience will be preferred.

Salary will be commensurate with qualifications and experience. Successful applicants will be employed either on 3-year contracts or on our permanent establishment.

## ATTRACTIVE FRINGE BENEFITS INCLUDE:

- \* free travel once a year on company services and concessional travel on other occasions on company services or other carriers; and
- \* free medical and dental treatment.

Applications with full details of age, education, experience, present and expected salaries and contact telephone numbers should be addressed to:

**Management Services Administration Manager**  
**Singapore Airlines Limited**  
**8th Floor, 77 Robinson Road**  
**SINGAPORE 0106**

before April 23, 1981

## SENIOR PROGRAMMER ANALYSTS

Progressive, expanding EDP service affiliate of \$3 billion bank holding company, seeks knowledgeable professionals. Initial responsibilities will include major role in installation of DISC ARP or CPCS. Subsequent opportunities for development are excellent.

Positions require solid programming and analysis skills. Experience as Programmer Analyst in an IBM/OS environment is required. Thorough knowledge of COBOL is essential. Familiarity with TSO, SP/ and Parvalet, or prior involvement with IBM/DOS would be helpful. Experience with DISC ARP, CPCS or 3890's would be a big plus.

Salary is competitive, benefits are excellent, convenient office park location in Waltham near Route 128.

Please send resume including present salary and requirements, in complete confidence, to Personnel Department, BayBanks Data Services, Inc., 235 Wyman Street, Waltham, MA 02154.

**BayBanks Data Services**

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## New Orleans Banking Opportunities

My client, a billion dollar bank, is looking for the exceptional data processing professional. If you are in the top 10% of your field you may qualify for one of these exceptional positions.

Sr. Analyst to \$33K  
Programmer Analyst to \$29K  
Programmer to \$26K

Banking experience is preferred but not required. The successful candidate will have a knowledge of large IBM systems and COBOL. So, if you are looking for an unprecedented opportunity in an aggressive environment call collect or write:

Joe Hotard  
Professional Staffing, Inc.  
1250 Poydras St., Ste. 820  
New Orleans, LA 70112  
504/524-0085

All fees, interviewing and relocation expenses company paid.

## SYSTEMS PROGRAMMERS AND ACADEMIC COMPUTING ANALYSTS NEEDED AT NORTH TEXAS STATE UNIVERSITY

Openings for two systems programmers and one academic computing analyst provide an opportunity for growth under desirable working conditions with IBM VM 370 OS operating system. Systems programmer qualifications include a degree, two or more years experience with IBM OS systems programming. Current system includes NAS 5000, VM 370, OS MVT, HASP, CICS and MUSIC. Academic Computing Analyst qualifications include degree (master's preferred), two or more years experience in academic computing, knowledge of common statistical packages like SAS and SPSS, FORTRAN desirable. Competitive salary. Mail resume to NTSU, Personnel Office, NT Box 13764, Denton, TX 76203 or call Tom Madron, 817/788-2324 or 817/568-5474.

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## TROPICANA Opportunities in the '80s

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Our sophisticated computer environment offers you a real challenge and opportunity for success working within a diversified programming operation. You can take pride in having experience with the best. With TROPICANA PRODUCTS you will use your recent degree in Computer Science and knowledge of Cobol to program in our high growth environment.

## SYSTEMS ANALYST

We are looking for creative people with a degree in Computer Science or related field, with 1 or more years experience interfacing with various aspects of day-to-day business/financial applications and process control systems in a large complex manufacturing environment. Good communications skills.

To investigate these challenging opportunities, send resume and salary history to C. Dowell, Dept. 977.

## TROPICANA PRODUCTS INC.

P.O. Box 338  
Bradenton, FL 33506

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## Programmer Analyst - New Hampshire

Rapidly growing EDP banking company in the Manchester, N.H. area seeking an individual with banking application and/or on-line experience. Must be able to effectively interface with users. Please send resume or call collect.

John T. Cook, V.P.  
P.O. Box 865  
Manchester, N.H. 03105  
603/624-3561

## D.P. MANAGER

NY state mfr. seeks indiv. to direct IBM S/3, sophisticated on-line CCP environ. Previous mgmt. bkgrd. req. Salary to \$30,000+ (fee paid). Contact Stan Durbin or Paul Melancon.

Robert Hall of Hartford, Inc.  
111 Pearl Street  
Hartford, Conn. 06103  
(203) 278-7170  
Personnel Consultants

## PROGRAMMERS

Melvin Simon & Associates, Inc., the nation's second largest shopping center developer, is seeking three (3) programmers for its Indianapolis Corporate EDP Department.

One of the positions requires 4-5 years programming experience in a general business environment with at least two years on RSTS/E.

The other two positions are entry level requiring an A.A. or a B.S. Degree in Computer Technology or Computer Science. Candidates must have had RSTS/E classroom or laboratory exposure.

We offer competitive salary and company paid medical, dental and life insurance. Send resume with salary history to:

Tom Hovanec  
Melvin Simon & Associates, Inc.  
P.O. Box 7033  
Indianapolis, Indiana 46207  
EOE

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## MIS PROFESSIONALS GET ON THE WINNING TEAM!

Applicon is a winner in Computer Aided Design and Computer Aided Manufacture, CAD/CAM. We're growing at a record pace and we need top MIS Professionals to help us direct and capitalize on that growth. Your own career will prosper in these high visibility positions.

### PROJECT LEADER/FINANCIAL APPLICATIONS

You will be talking directly with our financial people identifying their future needs and writing design specifications, preparing installation plans, supervising software installations and working with them to make the systems operational. You'll be using the latest technology and the best applications packages available. This is a senior position requiring MIS experience in project planning and control, analysis and systems design. BS with an MBA including an information systems specialty is definitely preferred.

### APPLICATIONS PROGRAMMERS (MIS)

We are actively seeking programmers to work on the implementation of new Financial, Marketing and Manufacturing systems. Two or more years of COBOL programming in an IBM environment required. Experience in the following areas a plus: DOS/VSE, JCL, CICS, data-base management, and on-line systems.

We recognize and reward individual achievement, while offering the potential for phenomenal career growth and accomplishment. We offer an excellent starting salary coupled with a realistic incentive program plus a superior benefit program including dental insurance and an employee stock purchase plan.

Send your resume to J. Stone, Applicon, Inc., 32 Second Avenue, Burlington, MA 01803.

# Applicon

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Candidates must have:

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- Strong IBM Assembly language skills

ADR offers:

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- Superior comprehensive benefits program
- Exceptional work environment

Additional information may be obtained by calling Mr. Ed Smith collect, at (201) 874-3033. Resumes may be sent, in confidence, to:

Personnel Director

**APPLIED DATA RESEARCH, INC.**  
Route 206 and Orchard Road, CN-8  
Princeton, New Jersey 08540

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**ADR**

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We just doubled our business volume and intend to do so again in the near future. This planned growth is creating opportunities for D.P. professionals in the distribution field. Our systems consist of DOS/VSE, CICS/VSE and DL1 running on a 3031 with a VM-4331 dedicated to the application development area.

POSITIONS to be filled are PROGRAMMERS, ANALYSTS and OPERATIONS MANAGER offering a combination of challenge and rewarding work, as well as a location near many outdoor recreational activities.

INTERESTED? Send resume to:  
John R. Berry, Personnel Mgr.  
Maas Merchandisers  
P.O. Box 790  
Harrison, Ark. 72601

### FACULTY POSITION

**COMPUTER & INFORMATION SCIENCES:** Full-time, tenure-track position as Assistant or Associate Professor in a program offering a bachelor's degree in software systems, information systems and systems analysis. Required: Ph.D. in computer science or related field; or equivalent research and development experience in computer science. Strong interest in teaching and specialization in one of the following areas preferred: Database, Operating Systems, Systems Programming, Computer Architecture, Computer Communications and Networks. Opportunity to participate in the development of an innovative CIS Program and to work in a professional and culturally dynamic environment. Rank and salary dependent on qualifications. Starting date: 31 August 1981 or 1 February 1982. Deadline for applications: 15 May 1981.

Send resume to:  
Search Committee CIS  
State University of New York  
College at Old Westbury  
Old Westbury, New York 11568  
AN EQUAL OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER

### EXPERIENCED SYSTEMS ANALYST/PROGRAMMER

Due to expansion and growth, large leading medical facility located in Central Texas is presently offering an opportunity to experienced, ambitious System Analyst/Programmer professionals. Excellent working conditions, living in a pollution free area among the friendly Texas atmosphere. Benefits are above the average including a unique medical service to immediate family. D.P. running on a 370-158 utilizing DOS/VSE, CICS, DL1 and some RPG.

Send resume to:  
Midland Lewis  
Scott & White Hospital  
2401 S. 31st St.  
Temple, Tx. 76788  
call collect: 817-774-2329 EOE

### Assistant Deputy Commissioner for Information Systems

Texas Department of Human Resources has a vacancy for the position of Assistant Deputy Commissioner for Information Systems in Austin, Texas. Job requires 4 year degree in computer science, mathematics or business administration with DP specialization plus 5 years experience in DP, two years must have been in a management capacity OR 9 years experience in DP with 4 years in a management capacity. Salary up to \$37.8K depending on experience. In order to be considered please contact Mr. Steve Rye, Office of the Deputy Commissioner for Information Systems, Texas Department of Human Resources, 512/441-3355, X 3023 or Ms. Sandy Nemecek, Personnel Div., Texas Department of Human Resources, 512/441-3355, X 4054 by April 15, 1981 for application procedures.

### COMPUTER PROFESSIONALS

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**TECHNICAL SUPPORT SPECIALIST**  
Excellent technical knowledge of Data General and Digital Equipment Corporation hardware and good written and verbal communications skills required. Will support marketing staff in making client presentations.

#### PROGRAMMER/ANALYSTS

Three years of experience on UNIVAC 1100 Series and EXEC 8/ECO.  
ABS offers competitive salaries, excellent benefits, and opportunities for growth. Send your resume to:

GAYLE BARTLETT  
ABS  
6525 Nacrest Road, Suite 300  
Hyattsville, Maryland 20782

### SYSTEMS ANALYSTS PROGRAM ANALYSTS

The North Carolina Baptist Hospital/Bowman Gray School of Medicine Computer Center is seeking qualified candidates for the positions of Systems Analyst and Programmer Analyst to assist in the development and maintenance of various management information systems. Three years previous medical and/or educational experience required for both positions. Honeywell L66 experience a plus. Send resume with salary history and requirements to: Systems Manager, Medical Center Computer Center, 300 South Hawthorne Road, Winston-Salem, North Carolina 27103. EEO.

### SYSTEMS PROGRAMMER

Chance to return to Utah with all its advantages. We are a large food distribution company seeking a well trained "Burroughs" systems person. Must be proficient in DCAIOL, Data Comm. and general systems applications. Excellent benefits. Salary commensurate with experience and our area. Write: Personnel Department, P.O. Box 30430, Salt Lake City, Utah 84130, or call (801) 973-4400.



## For EDP Positions in SEATTLE/PORTLAND

Houser, Martin, Morris & Associates  
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Computer Operations & Technology Mgr.	to \$60K
Manage large multiple 303X data center	
MVS Software Specialist	to \$45K
DOS to MVS Conv. CICS, JES2, DL1	
Data Base Specialist	to \$35K
ADABAS intervals, OS/MVS	
Storage Management	to \$35K
DASD management ACF2, RACF	
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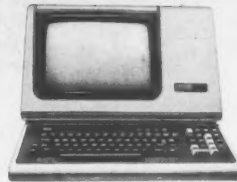
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Avail	125	138	4331	3031	135	148		3032	145	158	4341	3032	155	168		3033	PERIPHERALS				3330	3410	3203	1403	3340	3411	3505	1442	3350	3420	3525	2501	1255	1419	3880	All models Sale or Lease	On Line or Off Line Lease Sale	Avail. now Flexible Terms	<p><b>HP 3000-44</b></p> <p>BEAT THE HP PRICE INCREASE</p> <table border="1"> <thead> <tr> <th>Model</th> <th>Description</th> <th>Retail</th> </tr> </thead> <tbody> <tr> <td>32440A</td> <td>HP 3000-44 SPU (1-MB)</td> <td>76,755</td> </tr> <tr> <td>30018A</td> <td>ADCC MAIN (4-Ports)</td> <td>1,680</td> </tr> <tr> <td>30019A</td> <td>ADCC Extend (4-Ports)</td> <td>1,680</td> </tr> <tr> <td>7925M</td> <td>120-MB Master Disc</td> <td>22,050</td> </tr> <tr> <td>-102</td> <td>HP-IB Interface</td> <td>1,050</td> </tr> <tr> <td>7970E</td> <td>1600-BPI Tape Drive</td> <td>9,980</td> </tr> <tr> <td>-426</td> <td>HP-IB Interface</td> <td>3,885</td> </tr> <tr> <td>2608A</td> <td>400-LPM Line Printer</td> <td>10,400</td> </tr> <tr> <td>-110</td> <td>Sound Cover</td> <td>210</td> </tr> <tr> <td>-344</td> <td>HP-IB Interface</td> <td>895</td> </tr> <tr> <td>30079A</td> <td>General I/O Channel</td> <td>1,890</td> </tr> <tr> <td>2624A</td> <td>Display Terminal</td> <td>2,890</td> </tr> <tr> <td>32233A</td> <td>COBOL-II Compiler</td> <td>3,800</td> </tr> <tr> <td>32104A</td> <td>RPG Compiler</td> <td>1,900</td> </tr> <tr> <td>32100A</td> <td>SPL Compiler</td> <td>2,550</td> </tr> <tr> <td></td> <td><b>Total HP List</b></td> <td><b>141,815</b></td> </tr> <tr> <td></td> <td><b>Less 15% Discount</b></td> <td><b>-21,242</b></td> </tr> <tr> <td></td> <td><b>Net Sales Price</b></td> <td><b>120,573</b></td> </tr> </tbody> </table> <p>Change in business plans forces immediate sale of the equipment listed above. 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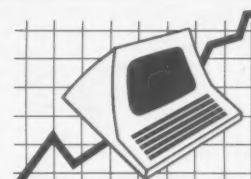
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